AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

Vol. XLII
Number 22

PUBLISHED WEEKLY AT 239 WEST 39th STREET
NEW YORK, MAY 27, 1920

Thirty-five cents a copy
Three dollars a year

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VOL. XLII NEW YORK—THURSDAY, MAY 27, 1920 NO. 22

Engineering Problems of Long Distance Motor Transport

Once more the motor truck is demonstrating that it is an efficient arm of the nation's transportation system. Consequently, this article on long distance convoys will be of timely interest, summing up, as it does, the experiences of the Motor Transport Corps in a recent long distance trip

THE motor truck, at this writing, is the production key in many scores of factories. This is especially true in the automotive industry, where the truck is most appreciated. Reports in the newspapers illustrate the extent this present-day use has attained.

Scores of traffic and production managers are capitalizing the transport experiences of the war, but, without exception, they feel the need of a better understanding of this new transportation link. The engineering departments of the factories are as interested in the developments as are the traffic divisions, because in the laboratory of extensive commercial use problems are being worked out in a manner that excels the test runs.

To-day there is no limit to the distance a distressed traffic manager will send a truck needed for materials. He is not inclined to consider seriously the arguments as to roads or traffic condition. He is inclined to believe that these may be solved by the truck. It is up to the traffic manager to get the materials once they are located, and he is putting his faith in the truck to bring back the goods that will enable production to continue.

In this emergency, a report of the transcontinental trip made by the Motor Transport Corps last summer is made public. On this trip, eight passenger cars, six light delivery trucks, three ambulances, four 5½-ton trucks, three 3-ton trucks, three 3-ton four-wheel-drive trucks, twenty-two 3/5-ton standardized Liberty "B" trucks, nine 1½-ton trucks and six motorcycles were run from Washington to San Francisco. The report, after giving the history of the undertaking, goes into its engineering phases and gives the results of the observations made during the tour.

It is conceded that the traffic manager of the automotive factory of to-day probably will not be confronted with conditions as severe as this convoy met, but the answer of mud and other road difficulties will be found somewhere between the solutions given in this article and the answer for normal truck transport which are known to each traffic manager.

So we present here the report of the transcontinental tour as prepared by Ralph H. Burton, an automotive engineer of the M. T. C., as a helpful exhibit in the present discussion of the efficiency of motor transport:

On all long distance trips made by automotive apparatus, the number of especially equipped trucks should be reduced to a minimum. The number of different makes of trucks should also be reduced to not more than one make of truck for any given capacity. By that is meant that all light delivery trucks from one-half to 1-ton capacity should be of one make. All 1½ to 2-ton trucks should be of one make, etc. This does away with the carrying of a considerable amount of spare parts, different size tires, etc.

Considerable time can be gained by having a standard speed rate. This was shown by the fact that at one time during the convoy the vehicles were stretched out over a distance of 31 miles, due to different speeds of the trucks. The gear ratio on trucks of the same capacity should be designed to give the same speed.

In country where sand and stiff grades are met, trucks of not greater capacity than 2 tons should be used, as the heavy cargo trucks were always in difficulty in passing through sand or over the mountains encountered on this trip. All observers seemed satisfied that the only place in the Army for the heavier trucks is near the base repair shops which, of course, are far removed from the zone of actual warfare. Chain drive trucks should not be used in sand, as the sand tends to clog the chain, forcing it from the sprockets. In sandy country, the four-wheel drive seems to be more efficient, as the four-wheel drive trucks often traversed roads wherein the two-wheel drive trucks were stuck. This seems to demonstrate that the principle of the four-wheel drive is the proper principle for rough and unimproved roads found near the first line of warfare. All trucks up to approximately 3-ton capacity should have pneumatic tires, as the trucks having pneumatic tires were able to pull through sandy stretches and over mountain grades, whereas trucks of similar capacity having solid tires were unable to pull through various places.

Trailers should not be used on unimproved roads. This was demonstrated by the use of a trailer on the transcontinental convoy west of the Mississippi River. The hard going of these roads gave the engine of the trucks as much work as it could readily do without having the added pull from the trailer. These road conditions are found not only throughout most of the West, but also in most of the Southern States. A great many parts of the West have but fair roads in dry weather, while directly after rains these roads are almost impassable for vehicles of a capacity greater than 2 tons.

Solid tire equipped trucks should have giant rather than dual tires, as the giant tires give better traction and seem to stand wear to a greater degree. In deep sand, a ridge of sand is pressed between the halves of the dual tires, increasing the road resistance. Production of the larger rubber companies seems to be turning from the dual tires to the giant type.

It is recommended that in all convoys the height of all bumpers be the same both front and rear. These bumpers should be faced with steel plates to prevent chewing up of the wood in going over rough ground.

The lighting system of the transcontinental convoy trucks was very poor for night driving. These trucks were equipped with oil lamps which gave very poor light, especially in the dust encountered on the American Desert.

Only a good grade of oil and grease should be used. This is proved by the fact that the only bearing troubles on the trip were caused by the use of poor oils and greases, because the best grade oils and greases were unavailable. All trucks should be equipped with wick-oiling devices similar to that on the standardized Liberty "B."

Skid chain devices should also be standardized, as practically every make of truck on the convoy was equipped with a different type of chain, giving wonderful opportunity to study their action. It was shown beyond a doubt that the skid chain device designed for use on the standardized Liberty "B" trucks was much more satisfactory than any of the other types. It was found that the theory of allowing slack in the chain was that the chain would not hit the tire at the same place on each revolution, but this is more or less a fallacy, as close observation showed that whether the chain was tight or slack it hit the tire at approximately the same place in every instance.

Special passenger car chassis are undesirable for convoy and army use; it being found on this trip that a standard ¾-ton chassis, adaptable to the mounting of special bodies such as staff observation, reconnaisance, machine gun, etc., is also adaptable to the mounting of passenger car bodies.

Motorcycles are of no use in convoy work. Not more than one of the six motorcycles making this trip made the entire run without being carried as cargo from time to time through the sandy and muddy roads and deep dust. In such a run, about the only use for motorcycles is to carry messengers from one end of the convoy to the other as a time saver. This might better be done by the light repair trucks, as the only reason for sending messages is to facilitate repair work. Motorcycles with side cars are not adaptable to carrying spare parts and mechanics.

Cooling System.—A radiator of the tubular type with cast upper and lower tanks should be adopted as standard on all Army vehicles, as it is simpler to clean and repair. This also permits the necessary parts from one radiator being used on other radiators, as these parts are machined to give interchangeability. The radiators should be spring suspended. Flat belts should be used for driving the fans, and the material should be very good. It is thought that 50 per cent of the delays were caused by fan belt trouble. These flat belts should be of the endless type rather than laced. V fan belts are not desirable, but if used should be protected by some sort of dust pan placed in front of the lower fan belt pulley. Either radiator shutters such as the standard Liberty "B" should be made standard on all trucks, or a thermostat arranged for controlling the temperature of the water should be installed. As a rule, all radiators on commercial vehicles are undersize to give the proper cooling necessary for the engine when driven as they are in the Army. Occasions were noticed of even the standardized "B" engines overheating, and this truck has a radiator of very great capacity when compared with commercial trucks of similar size.

Engines.—Valve tappet arrangements on the standardized Liberty "B" truck gave more trouble than on all the rest of the trucks put together. The heat treatment of the cam rollers evidently varies according to the firm making these parts. Tappet assemblies made by some firms gave considerably more trouble than tappet assemblies made by other firms.

Miscellaneous gaskets on the engines should be done away with and copper asbestos gaskets or gaskets of an approved material should be used to replace them, as considerable trouble from leakage, especially in the inlet pipe, was experienced on all trucks.

It is absolutely necessary in convoy work that the governors be set to give a more efficient speed for that particular truck and that the drivers be cautioned so that they will not disconnect the governor. Practically every engine governor was out of commission before the convoy had been on its way a week. It was a common occurrence to see a truck that had been pulled out alongside the road for the purpose of making minor repairs running at a speed of 20-25 m.p.h. in an effort to regain its proper

place in the convoy. This practice should be discouraged, as the vibration and wear and tear of the motor is too great. Some simple means should be provided for determining the oil level in the crankcase of the engine. It is suggested that plugs or cock similar to those used on some of the passenger car engines be adopted as standard.

Ignition, Carburetion, Lighting and Starting Systems.—Carbureters should have adjustments and moving parts enclosed and protected from the dust in some manner. These moving parts should be few in number, and the various adjustments should be difficult to make so that the inexperienced Army driver will not attempt to change the carbureter adjustment on the road. Carbureter adjustment should be left to an experienced mechanic.

The air choke valves gave considerable trouble, due not only to the clamp arm loosening, permitting the valve to partly close, but also due to the shutter working loose from the shaft. A large drain valve should be placed in the bottom of the gasoline tank in order that gasoline may be drained out for the use of some other truck stranded on the road for lack of gasoline. An air cleaner is absolutely necessary for use in sandy traveling, as it was frequently necessary to stop in order to clean the thick alkali dust from the carbureter. This dust would be drawn into the air intake and would soon clog the carbureter.

The electrical systems in general gave excellent service with the exception that in sandy sections fine dust collected on contacts, interfering with their adjustment. The magnetos used should be corrected in that the air gap between the distributer block and pencil is not great enough to prevent short circuiting. It is not recommended that electrical or mechanical starters be placed on trucks intended for purely military uses; provision, however, should be made that these starters can be installed for peace time organizations, such as public roads, post-office, Interstate Commerce Commission and other departments of the Government to which war time vehicles are transferred at the end of the emergency.

The side lights and searchlights used on the trucks were entirely unsuitable, it being impossible to see much more than 15 ft. ahead. The carbide generators were poorly designed and made. The present construction, having clamps made to throw over the center, is very poor, as the vibration of the truck and the weight of the tank tends to open up these clamps, permitting the tank to drop from the generator.

The hose connection from the generator to the searchlight should be made of flexible metallic tubing, instead of the rubber tubing which is now in use.

Clutch.—All clutches should be of one type, permitting the carrying of a smaller number of spare parts in the repair trucks.

Transmission.—The control levers of the transmission gearsets should be standardized. In order to relieve the strain under which the drivers are placed on such a trip, it is necessary that they sometimes be shifted from a heavy truck to a light truck, and vice versa. A transmission brake should not be used on the heavy trucks, but is perfectly feasible in army work on light delivery trucks and passenger cars, although it is preferred that the regular type of braking on the rear wheels be employed in order to use a standardized design. It is recommended that a unit power plant having shaft drive to the rear wheel be employed on motorcycles instead of the chain drive now employed. While this may complicate the design, a chain drive as now used seems to be impracticable especially in sandy country under army conditions.

Vehicle Control.—The braking systems at present adopted on the standard trucks are not in general very satisfactory, due perhaps to the use of the Hotchkiss drive. The brakes on the standardized Liberty "B" truck gave the least trouble of any on the convoy. These are properly designed so that even though the drive be taken through the springs, there is no grabbing action or moving of the brake pedal and lever. The brakes themselves are expanding bands operating on the brake drum mounted on the rear wheels.

The spark and throttle control on the various trucks are exceptionally well designed, with the exception of the accelerator pedal. Considerable trouble is experienced in operating this, due to its various locations and size. The standardized "B" trucks on this convoy had a foot accelerator which was exceptionally hard to operate. This design has been changed, however, so that the push down type of pedal, mounted between the transmission control and the brake pedal, is used. One commercial make of truck has the accelerator pedal mounted between the clutch and brake pedal. This is very undesirable, as sometimes the driver accidentally steps upon the accelerator pedal when it is his desire to throw out the clutch or operate the brakes.

The steering gears were very strongly constructed, and the only criticisms are that lubrication is difficult and that a greater gear reduction should be used to make the steering easier.

Wheels.—Cast steel wheels should be standardized upon for all heavy cargo trucks regardless of size, speed, etc. Passenger cars and light delivery trucks should be equipped with pressed steel disk type wheels. A considerable amount of trouble was caused on the transcontinental convoy because of the shrinkage of the wooden artillery type wheels with which most trucks except the "B8s" were equipped. In one case this shrinkage permitted the tire to creep from the felloe band. All of the trucks, with the exception of the very heaviest cargo carrying types, should be pneumatic tired, as the trucks having pneumatic tires give much better performance than those of similar capacity using solid tires. The odometers mounted in the wheels were very unsatisfactory usually being inlaid with plaster of paris, which cracked very easily, destroying the ability of these odometers to measure distances accurately.

Bodies.—The bodies as a whole were well designed and built. About the only criticism advanced by observers on this trip was that the trucks of one particular make had wheel interference with the mounting sills. This, of course, is easily remedied by moving the cross sills to a different location, giving ample wheel housing clearance. Non-rigid tops should be used in all cases, as clearance of viaducts, tunnels, etc., in the United States is not sufficient to clear the rigid tops at present in use on some Army vehicles.

Equipment and Hardware.—Horns, body hardware, etc., should be mounted in better fashion, as at the end of the trip there was not a rope cleat nor stake pocket which was not loose. Hood fasteners should be re-designed as they are not sturdy enough to stand such rough travel. The trip across the desert proved beyond a doubt that the efficiency of the engine at high temperature is improved by having either one or both sides of the hood open. Very few vehicles, however, had provision for holding the sides when folded on top. The result was that the sides soon fell down, not only breaking the hood fasteners, but also damaging the ledge on which the hood rests. Some arrangement should be made so that the sides can be easily removed or held securely, so that there is no danger of them falling when folded back.

The German Passenger Car Industry After the War

Both technically and commercially, the German automotive industry, hampered as it is by the post-war political, labor and economic conditions, is described by this Berlin writer as being chaotic and disturbed. Among other phases discussed here is that of a probable American invasion.

By Benno R. Dierfeld

IN discussing the latest developments of the German automobile industry, the subject must be considered from both the technical and the business points of view, and the political aspect also must not be overlooked. These questions will be dealt with in this article in as comprehensive a manner as is possible at the present moment.

Prior to the war the design of the different German passenger cars did not differ materially; indeed, one chassis looked like another, except for some minor details. The characteristics of the standard passenger car chassis were somewhat as follows: Four cylinder engine with integral head, L-head or T-head type cylinders, simple cone clutch, or disk clutch running in oil, sliding gearset with three or four speeds, gear lever invariably at the right side, Ackermann steering, with the steering column at the right side, service brake on the gear box, emergency brakes on the two rear wheels and operated by a hand lever located near the gear lever at the right side of the driver's seat. Final drive by bevel gear and cardan shaft with one universal, enclosed in a propeller shaft tube, or with two universals and torsion rods. Front springs invariably were half elliptic, rear springs three-quarter elliptic, occasionally half elliptic, frame always overslung and swept in at the front as well as dropped at the rear, all bearings in gearset, rear axle, or wheel hubs, ball bearings.

Assembled Cars Unknown

Equipment usually comprised detachable rims or wheels but the lighting was seldom electric and self-starters were used only on high-powered and high-priced cars—but even then in very few cases. Assembled cars were unknown and every small factory with a yearly output of a few hundred cars had its own engine, gearset, clutch and rear axle, but, of course, these conformed to the layout above detailed. Conservatism in design went so far as to lead to the publication of announcements of "new models" if the cylinder bore of the engine was increased by some millimeters.

This conservatism in design is indirectly the result of the past régime. The Kaiser and the other two dozen German sovereigns used German automobiles, without possessing any particular knowledge of their construction or being intimately interested in same. Therefore, the manufacturers had no interest in improving or modernizing their design; perhaps they were too timid to change their "approved" constructions. Prominent German people, the *nouveau riche* and the great number of other wealthy customers were anxious to buy cars of the same make as "His Majesty" or "Prince X," etc., used, and as the same conservative firms which were purveyors to the imperial or royal families also repeatedly won the Grand Prix in the great French races, the public was hypnotized and the technical writers seldom criticized the antiquated designs. Of course, the smaller firms produced more original cars.

Neglected Style

Aside from the above, German designers neglected an important factor in the automobile business, namely, the value of the car as a fashion object. The passenger automobile of to-day is not simply a utility machine, but is at least 50 per cent an article of luxury in the same manner that a woman's costume serves a double purpose as simple clothing and as a means of embellishment. Usually the latter purpose will be decisive in buying and that type of costume will be chosen which differs from last year's model in certain details, well known to the costumer from the fashion journals. Almost the same considerations control in passenger car buying, where the final decision generally rests with the woman. American designers thoroughly appreciate this peculiar side of the passenger car business, and the immense sales of passenger cars in the United States can probably be ascribed largely to that reason.

Of course, the situation in Germany changed during the war; German designers studied the captured American cars, discovered their comfort and the advantages of certain arrangements of technical details.

Leaving the peculiar labor situation out of consideration, the manufacturing methods of German factories, and probably of all European factories, cannot be compared with the methods used in America. Four years of war and employment in Government work without competition does not prepare properly for the keen international competition now beginning. Jigs and the machine tools in the automobile factories are not the time and labor saving devices which they should be and works organization is strongly impeded by aversion of the workmen to piece work or any other arduous labor. But the principal fault of the factories is the lack of modern means of transportation. If one part in machining must pass through four or five machine tools successively, there are no chain conveyors, link belts, or roller ways for transporting it, the only means of transportation provided being hand trucks, which must be unloaded and loaded again at each machine tool.

Tedious Production

The conveyance of the raw material from the motor truck to the stock room and of partly machined pieces from one factory building to another across the factory yard is usually accomplished by means of hand trucks or horse trucks; very seldom are tracks laid and, if tracks exist,

they are generally used without motive power. All the excellent modern means of transportation mentioned above, especially the small industrial trucks with electric drive, are either unknown or not used. This, however, applies equally to factories in other European countries.

In recent articles in the German business press, attention has been called to the transportation problem and its solution by American factories, consequently improvement is to be hoped for as a result.

Rational and economic production is also hampered by the large number of car types built by one firm, which is still too great despite the consolidations previously mentioned. If one factory produces from 1000 to 1600 passenger cars yearly, then there is no occasion for turning out more than a single model. However, there are factories with not much greater production which build one or two passenger models and one truck. Specialization and concentration upon a single model will be the only plan by which the German works, with their comparatively small production, can hope to achieve commercial success.

Promotion High

After each war, whether lost or won, a period of company promotion sets in; this symptom can be observed to-day in Germany as well as in England and France. A great number of firms made shells and other war material during the war. They possess working capital and buildings with machine tools which in their opinion are suitable for automobile manufacture, and they believe in the future of motor traction. Possibly the owners of these plants served in the transport corps and so acquired a primitive knowledge of motor car construction, which seems to them sufficient for taking up automobile manufacture. Indeed, there are about a dozen new firms whose sudden rise could not be explained in any other way. Most of these new firms work with small capital and manufacture cyclecars or light cars; many of them already have had to revise their designs, despite their short existence.

There are some strange outgrowths of this promotion fever. About a year ago the German automobile papers were filled with advertisements of a new "really low-priced" car. According to the description, it was a cyclecar with single-cylinder 8-hp. engine, friction drive and two-seater body, the price being 2,500 marks. Soon the company had booked orders for 20,000 to 25,000 cars, according to statements of its agents. But the design was not up to date and obviously had many serious faults; therefore, a few months later the company turned out a new model with water-cooled, four-cylinder engine, two-speed sliding gearset and shaft drive, at the price of 4,500 marks. The total number of orders received was stated to be for about 50,000 cars and, as each buyer was required to make a deposit of half the price when placing the order, a large amount of capital flowed into the company's treasury before a single car was delivered. Later, the German Motor Manufacturers Association issued a statement to the effect that the "new model" existed only in a single example, the demonstration car, and this demonstration car was not built by the company sponsoring it but by another concern of good repute and, moreover, the car could not be produced for less than 9000 marks. This statement was issued six months ago and to-day this sum would have to be multiplied by five or six. Probably an endless series of lawsuits will result.

Opel 6/16,

4 sitzig, pr. Lederpolster., Mod. 1913, Mot. 18399, abnehmb. Landaulett, Auff. dunkelblau und schwarz, neu lackiert amerik. Verdeck extra, fünf K. P. Z. Räder mit sehr guter Auslandsbereifung u. Schläuchen, Maschine Ix, Getriebe usw. desgl., mit vollständiger Ausrüstung, Werkz. Kilomtr. Zähler, Scheinwerf., M. 75 000, o. St

verkauft

Jähnichen,

Nürnberg,
Kopernikusstr. 11.

Fig. 1 — This 16-hp. light car, without electrical equipment other than the ignition system, was built in 1913 and is offered for 75,000 marks

25/55-PS-Benz-

Luxus-Automobil (Phaethon) 6 Sitze in Fahrtrichtung, mit Bosch-Dynamobeleuchtung, elektr. Scheinwerfern und Kurvenlampen aus Messing, prima neuem antikem Lederausschlag, Klubsesselpolsterung mit Mittellehne, moderne Karosserie mit eingebauten Schränken, Drahtspeichenräder, 2 Stück Reserve, Kilometerzähler, Gepäckhalter und neuer schwarzer Lackierung, Ausfuhrpapiere vorhanden, sofort zu verkaufen, jedoch ohne Bereifung.

Preis 225 000 M.

Automobil-Reparatur-Werkstatt,
Alte Jacobstrasze 11-12. Moritzplatz 5272.

Fig. 2—A high-powered used touring car. The price of 225,000 marks equals some $3,750 at the Berlin exchange rate

However, among the newly founded firms are some with very sound financial backing. One prominent concern of this sort is the Actien-Gesellschaft für Autogenschweisserei (Acetylene Welding Co.) of Berlin-Lichtenberg. This concern built before and during the war apparatus for autogenous welding and now produces a passenger car in a single model, the AGA, a small car on conventional lines. When the automobile papers announced in July, 1919, that the AGA car was being built in lots of 1000 and that a large number were to be turned out within a year, it caused quite a sensation in the old and conservative industry, but at the time of writing the first lot is still far from completion, on account of labor difficulties, strikes, etc.

There is no real need for promoting new automobile factories, for the old plants were considerably enlarged during the war and their managers are hard put to it to keep them fully occupied. On account of the acute shortage of coal and raw materials, the difficulties of keeping the large organizations busy are almost insurmountable.

All works are well supplied with orders, which mostly date from the period before and during the revolution; but these orders will not be filled at the stipulated prices. The German Motor Manufacturers Association, in December, 1919, published a proclamation that all car sales made before and during the revolution at prices involving a loss would be annulled. It was pointed out that at the conclusion of the sales contract it could not be foreseen that the commercial and economic situation would change so drastically. The cost of raw materials and parts and the wages and salaries paid had multiplied, the willingness and capacity of labor had greatly declined, money was depreciated and production was rendered so difficult by strikes and shortages of coal and raw material that the original prices now fell far short of the manufacturing cost.

The Automobile Club of Germany (formerly Kaiserlicher Automobil-Klub) and the other automobile owners' associations are protesting vigorously against this decision and especially against the fact that a whole industry should break all contracts for delivery, entirely disregarding conditions that affect individual cases, since particular cases differ so materially. Undoubtedly many sales were made only because the salesmen harped upon the prospective aggravation of the general situation. Furthermore, conditions are not the same at all factories; many works, particularly those in the occupied territories, are in a more favorable situation. Finally, the buyer cannot bear the whole loss, etc. A monster lawsuit will prob-

ably be the result of this divergence of opinions.

The policy of the German automobile industry is not far-sighted. For instance, a few months ago the tire factories purchased rubber at a high price, because the dollar was then equal to about 100 marks; now the dollar has dropped to about 60 marks and the rubber prices in the world's markets also have dropped suddenly. The tire factories, however, do not purchase the cheap rubber now offered because they still have left some of the supply laid in when the prices were high. Of course, foreign tires are now cheaper and imports increase.

The car factories are in a similar situation and the result is that exorbitant prices are paid for both used and new cars. For the purpose of illustration, I append three advertisements clipped from the sporting supplement of the widely read daily *Berliner Zeitung am Mittag*, issues of April 13 and 14, 1920. Fig. 1 is an advertisement of a second hand car of 16 b.hp. This light car was built in 1913, has detachable landaulet top, is newly painted and possesses no electrical equipment beyond the ignition system. The price of 75,000 marks, equal to $1,520 at the present rate of exchange, is indeed somewhat too high, but it will be paid. As to the horsepower figures, the number at the left of the oblique line means the tax horsepower and the number at the right the brake horsepower.

In Fig. 2, is shown another characteristic advertisement; it refers to a large high-powered used touring car, without date of manufacture, newly painted, with Bosch generator lighting system but without self-starter. The price of 225,000 marks, equal to $3,750, is not particularly low if one bears in mind that no tires go with the car. Fig. 3 shows a collective offer of used cars, all newly painted. Disregarding the Phänomobil, which is an old tricycle, and the Argus, which is an orphan car, the prices vary from 45,000 to 210,000 marks, equal to $800-$3,500 for cars of 15 to 40 brake horsepower, probably without electric lighting and certainly without self-starters. Perhaps there are no tires.

As mentioned before, these abnormal prices are not only demanded but actually paid, although they are in no proportion to the value of the German mark in the international money markets. This curious fact can only be accounted for by inability of the German factories to meet all demands of prospective customers. This fact cannot be overlooked by prospective importers. In this connection, it is interesting to state that the German population amounted to 65,000,000 before the war and that there were only 80,000 automobiles in use; this makes only one car for each 700 inhabitants, even when allowing for loss of territory as a result of the war. The corresponding figures for the United States is one car for every fourteen inhabitants.

Furthermore, it is interesting to note that there are frequent rumors of an American industrial invasion, and some time ago the *Daimler Motoren Gesellschaft* of Unterturkheim, manufacturers of the famous Mercedes car, published a statement that reports concerning the sale of its plant to an American company were fabrications, and the Opel works at Russelsheim threatened in large advertisements to take legal action against anyone who spread the rumor of the purchase of their works by an American syndicate.

The March disturbance, called the "Kapp-Putsch" from the ringleader Kapp, an ultra-reactionary, was answered by the workmen with a general strike, with the result that the revolt broke down within a few days and Kapp, with his following, fled. This unexpected success has considerably increased the self reliance of labor, which was by no means negligible even before the Putsch, and the works managers in consequence have a great deal of trouble. The whole time of the strike counts as working time and must be paid for, and the "Betriebsrategesetz" (law of factory soviets) has been ratified by Parliament. These factory soviets represent at each plant a sort of collateral government, wielding unrestricted power. The factory soviets are elected by the workmen, and employees fix working conditions, hours, rate of wages according to the work performed, etc., and are the real power in the plant.

Sofort greifbar:

1	Limousine Mercedes	16/40	210 000 M.
1	Phaethon Mercedes	16/40	200 000 "
1	Benz Landaulet	10/30	160 000 "
1	Landaulet Opel	10/25	85 000 "
1	Landaulet Mercedes	10/20	110 000 "
1	Phänomen	10/30	80 000 "
1	Limousine Argus	33/70	75 000 "
1	Phaethon Opel	10/28	95 000 "
1	Phaethon N. A. G.	6/16	45 000 "
1	Phaethon Adler	7/15	60 000 "
1	Phänomobil geschlossener Kasten		12 000 "

sowie **9 Motorräder, Pneumatiks, Magnete** usw.

Alle Wagen sind neu lackiert, Spitzkühler, eingelegtes Verdeck und wie neu.

Pahl & Sauerbrey

Alt-Moabit 16 - Telephon: 4083 Moabit

Fig. 3—A collective offer of used cars, the advertisement being reproduced from a German sporting paper supplement

The actual effect of the disturbance upon the automotive industry was not serious; the works at Berlin and in the Northwest of Germany were shut down for the twelve days of the general strike, without suffering any damage. Most of the factories in South Germany and all the plants in the occupied territory were working as usual. But in the Ruhr district and in the former Kingdom of Saxony, especially at Plauen, the plants were seriously damaged under the communists' reign of terror which lasted for four weeks.

Joint Engineering Body

ENGINEERING organizations, both national and local, throughout the United States have been asked to participate in a conference at Washington, June 3 and 4, to be held jointly by the American Society of Civil Engineers, the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers and the American Institute of Electrical Engineers. The purpose of the conference, which has been under consideration for some months, is to obtain co-operative action of engineering and the allied technical organizations to consider matters of common concern. It is pursuant to the action of Jan. 23 by the governing boards of the four organizations named as well as the American Society for Testing Materials.

The conference will effect a permanent organization as a body to correlate the activities of the various groups among its members, although it will not, of course, affect the individual activities of any of its member bodies. The headquarters of the conference committee, which has L. C. Marburg as secretary, is the Engineering Societies' Building, 29 West Thirty-ninth Street, New York.

American Farmers Potential Market for 8,500,000 Cars in Ten Years

The increased prosperity of the farmer has created a large field for automobile sales. It has not been intensively cultivated thus far, but offers future potentialities which should be carefully considered. Interesting facts appear in this article as a result of a recent investigation

THE automobile is at once the greatest desire of and an essential necessity for every farmer. Country bankers, county agents, small town merchants, all people who are familiar with farmers and farm purchases, name automobiles as the first thing that farmers buy with whatever profits they have above living expenses."

Farmers at present own 40 per cent of the automobiles registered in the United States and 5 per cent of the farmers owning automobiles own more than one such vehicle. There was, at the beginning of this year, an immediate market for 1,000,000 new automobiles among the farmers and within a 10-year period the farmers of this country will require 8,500,000 cars. The above quotation and the following statements about the probable passenger car market on the farms are a part of the developments of the research into the farmer market for automobiles by *The Farm Journal.*

This research begins with the investment in farms, which is placed at $51,000,000,000. This compares with $22,000,000,000 investment in all manufacturing industries and $21,127,000,000 in railroads. Another way of comparing the size of the industries, is the number of persons employed. The farm labor is put at 13,843,518, which is as many as any other six industries.

As the current year's market for motor cars, the statistician estimated that from 400,000 to 600,000 farmers were immediate prospects for sales as first buyers and that 10 per cent of the present farm owners of cars were possible buyers—another 250,000 car requirement.

"Several years of exceptionally high prices have given the farmers accumulated wealth." The farmer has become one of the most prosperous men in our country, according to this report, which goes on to show the reasons for his prosperity and why it will continue in the future. Chief among these reasons are:

1. There has been a steady increase in the prices of farm lands for several years.
2. These increases will continue because of the intensive cultivation of the land.
3. The prices of farm products have increased enormously.

As a result of these advantages, the buying power of the farmer has constantly increased, and it is estimated by the N. A. C. C. that 60 per cent of the new automobiles are being sold to farmers.

The significant fact is that, not only are farmers now large buyers of automobiles, but also that every indication points to the farmer market as a constantly increasing and developing one. The "good roads" movement is progressing rapidly all over the country and with its success the farmer is certain to become an increased buyer of automobiles. Many farmers are beginning to own two cars. This is because their wives and children use one of them extensively, or because hired men, living on neighboring farms, must be supplied with an automobile to convey them to and from work. Cars are also used for hauling light produce, etc.

To the farmer, moreover, to a greater degree than to the city dweller, the automobile is a business necessity. "Answers to a questionnaire show that 90 per cent of farmers use their automobiles for business, and that these farmers use their automobiles for business 67 per cent of the time. The farmer must provide his own transportation and it is probable that the cost of maintenance of horses and equipment and the depreciation due to road work, makes transportation more expensive by horses than by the use of automobiles."

Investigation shows that farmers are buying a better class of cars than they once did. An analysis of the 1919 registration figures of farmer-owned cars indicated these results:

40½ per cent are Fords, while a few years ago 70 to 80 per cent were Fords.
5½ per cent are cars costing under $900.
27½ per cent cost between $900 and $1300.
23½ per cent cost between $1300 and $2500.
3 per cent cost over $2500.

"The experimental stage is over for the large proportion of farmers and they are in the market for better automobiles. A large number of new buyers will profit by the experience of their neighbors and buy better cars to start with."

An analysis of the 4,000,000 farm owners who may be considered as live prospects for automobile sales, throws some interesting light upon the sales possibilities of the various sections of the country. The analysis shows the following prospects in different sections:

New England	168,408
North Atlantic	394,851
Southeastern	477,361
Southwestern	1,027,335
Middle	1,567,990
West	312,777

The farmer, as well as the industrial manufacturer, is confronted with a serious labor problem and the automobile is playing a large part in solving it for him. It helps him to keep his sons on the farm, by providing them with pleasure and enjoyment, as well as with a means of getting to nearby towns in a short time and convenient manner.

It serves distinctly as a means of broadening the life of the farmer and his family and gives him the most serviceable outlet for the proceeds of his increased prosperity.

Types of Motor Trucks in Use by the Municipalities in England

Several interesting designs of truck equipment are described in this review of British practice. Fire engines, street cleaners, tipping bodies and other machines are becoming of more or less general use. Construction features of several of them perhaps might be used in the United States.

By M. W. Bourdon

SOMETHING much akin to a boom is now occurring in connection with motor transport in Great Britain. After many years of uphill work, truck manufacturers are at last reaping the advantages of their foresight. Trucks are being demanded for use in almost every sphere of industrial activity and the comparatively few municipal authorities who before the war used trucks for various purposes have now a host of followers, who have commenced to appreciate the advantages and economy accruing from motor haulage. Not only should this be of direct benefit to taxpayers, by better services being maintained at less cost to the community, but it also should make for the advantage of other truck users. That is to say, municipal engineers will be compelled to consider the question of good roads from the user's point of view, and this fact cannot do otherwise than tend towards the improvement of roads.

Fire Engines.—One of the first services wherein municipal authorities were able to appreciate the possibilities of motor truck chassis was in connection with fire fighting, and there are few towns or cities in England, as distinct from Scotland and Wales, with a population above 50,000 wherein is not to be found a motor fire engine of one type or another. Mostly they take the form of pumps, although the horse-drawn steam fire engine is still frequently retained, and a motor-driven "first aid" outfit with a short escape used to supplement the old style equipment.

But there are many hundreds of small communities in England, and a great number of the larger towns in Scotland, Wales and Ireland, where motor fire engines have still to make their appearance. In some small towns, say up to 10,000 inhabitants, the authorities have not discarded the ancient horse-drawn manual pumps. It is likely that these authorities will, when they do make a move, jump the steam fire engine and plunge direct into investing in a motor-driven equipment.

In connection with motor fire engines, a development, which is meeting with some favor in certain quarters, has taken form in the Tilling-Stevens gasoline-electric equipment. The chassis which forms the basis of the outfit is one that is fairly extensively used for country bus services, and, to a smaller extent, for freight trucks. It embodies a four-cylinder 5 x 6-in. engine. Directly coupled to the crankshaft is the armature shaft of an electric generator, which supplies current to an electric motor, the drive from the latter being conveyed to the worm back axle through an open universally jointed propeller shaft. No batteries are used, except those for the usual lighting outfit. Speed is controlled by the throttle pedal and also by an electric regulator of the multiple contact type which operates by varying the resistance in the shunt-field of the generator and by shunting the series field of the motor.

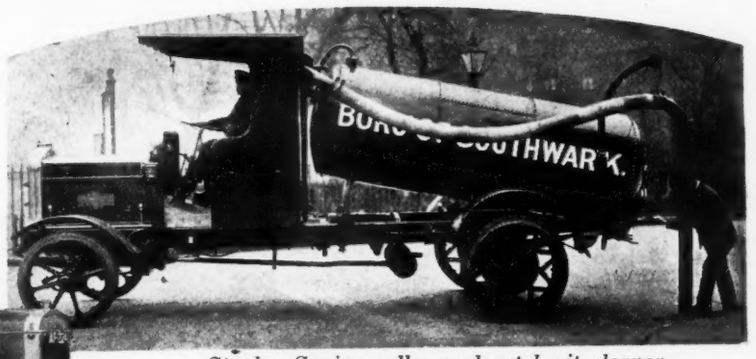
The fire pump outfit is a separate unit which can be operated either in the position on the chassis, where it is carried to the scene of the fire, or dismounted and run on its own wheels any desired distance away from the chassis, the only limitation being the length of connecting cable. The pump is of the two-stage centrifugal type and is mounted with its shaft vertical and coupled to the vertical armature of an electric motor mounted immediately above it. The rated capacity of the pump is 350 gal. p. m. at 120 lb. pressure.

One obvious advantage of this separate unit system is that it enables the pump unit to be taken close to the fire, when it might be impossible to run a composite unit and chassis up close to the scene of operations. The unit is mounted on two wood wheels with steel tires, which are carried on the chassis well clear of the ground. Each wheel has on its hub a cable drum, by means of which and of cables attached to the chassis it can be remounted on a ramp on the latter in 20 seconds. Six-foot tubular extensions of the pump frame are provided to control and maneuver the unit when it is detached from the chassis, these extensions normally telescoping within tubular members attached to the chassis frame.

Street-Cleaning Machines.—One or two firms are making special chassis for street cleaners, by means of which the road surface can be sprinkled and swept, the dirt being loaded by means of the broom and hopper system in a receptacle carried on the chassis. This class of machine is, however, infrequently adopted, although several examples of spraying and sweeping units have made their appearance. One of these—the Lacre—is illustrated herewith. This is a specially designed three-wheel chassis with a 12-hp. four-cylinder engine. Between the engine space and the driver is carried a 100-gal. water tank, which feeds a pair of sprayers arranged ahead of the front wheels. Passing diagonally under the center of the chassis is a 23-in. diameter rotating brush, giving a 6-ft. 6-in. clear sweep. The brush is easily demountable, and can be replaced by a scraper or a squeegee.

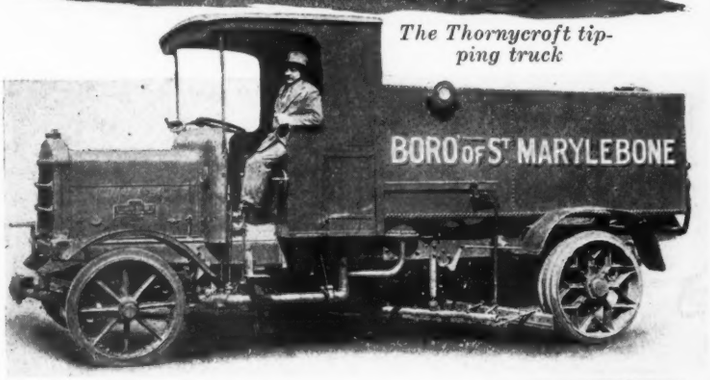
A similar type of machine, but on a larger scale, is exemplified by the 5-ton Straker-Squire outfit. This has a 1100-gal. water tank, the water from which can be used either for sprinkling through two adjustable nozzles arranged in front of the vehicle or for road washing under pressure. For the latter purpose, an engine operated pump draws water from the tank and delivers it

British Municipal Motor Equipment

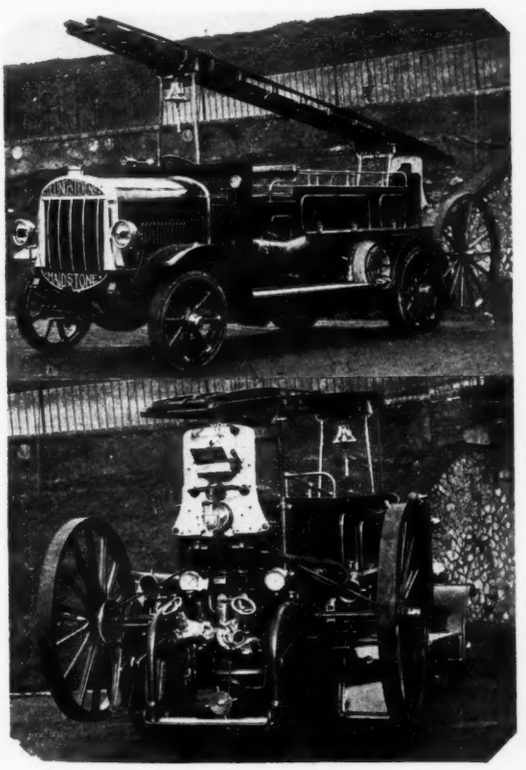


Straker-Squire gulley and catch-pit cleaner

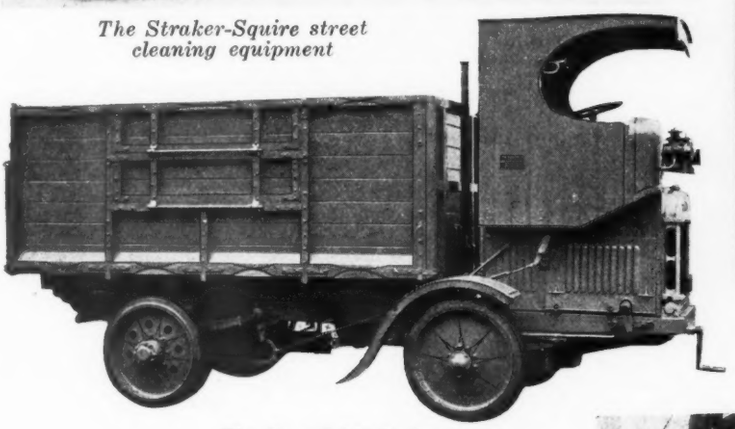
The Thornycroft tipping truck



The Straker-Squire street cleaning equipment

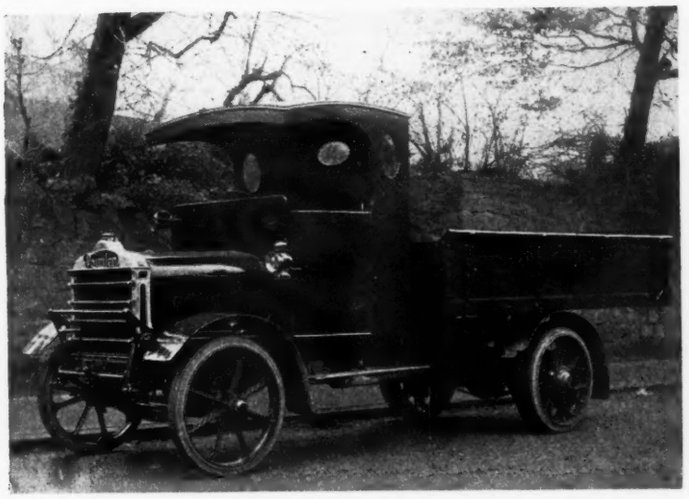


The Telling Stevens petrol electric fire pump outfit, in which the pump unit is detachable



The Pagefield tipping truck

The Lacre 12-hp. three-wheeled cleaner



The Daimler 2-ton tipping truck

at 25 to 35 lb. pressure on the road surface at an angle of 30 deg. Another water outlet forms a gutter flush, while behind this is a diagonally arranged five-sectioned rubber squeegee.

The Straker-Squire company also has introduced an equipment for emptying roadside gulleys, surface water traps and cesspools. The chassis carries a cylindrical 850-gal. tank inclining at an angle toward the rear. A partial vacuum is set up in this tank by an engine-driven pump, which can be operated while the vehicle is either stationary or moving. Upon arriving at the scene of operations, a 6-in. diameter hose with a metal end and grid baffle is lowered into the gulley or catchpit; upon the control valve being operated, the vacuum draws into the tank any water and sediment in the pit. The contents of the tank are released through a large diameter opening at the rear end, which is normally closed by a cover-plate held by a screw fixing. The final release of the cover-plate is, however, made by trip gear, which can be operated by the man in charge while standing clear of the outlet.

Tipping Bodies.—Trucks with tipping bodies are widely used by British municipal authorities. Both engine-operated and hand-operated screws are utilized, while a third type of body is mounted on rollers along which the body is drawn rearwardly by hand or engine cable gear until gravity causes it to tip.

It seems probable that the roller type of tipping body will eventually be most favored, unless screw gears can be far more completely protected than they are at present. In some cases, the screw is entirely without protection and operates, more or less satisfactorily for awhile, smothered with a mixture of grease and dirt. These screw gears, too, are often subject to criticism from other aspects. Frequently they take effect at, if not behind, the center of the body. This failing is particularly noticeable in the few examples of hydraulic lifting devices, the idea being to reduce the necessary length of the ram, which in most examples assumes a position almost vertical when out of use.

To provide a steep angle of tip with a front screw, the Pagefield company uses two screw shafts, one operating within the other. The obvious weakness of the smaller shaft is a failing of this arrangement. The 4-ton chassis on which this tipping body is mounted is of a special type designed for maneuvering in confined quarters. It has a short wheelbase (96 in.), which gives a turning radius of 18 ft. The maximum tipping angle of the body is 60 deg., the screw gear being either engine or hand-operated.

Hydraulic Tipping Gear.—The Daimler 2-ton tipper, illustrated, has an hydraulic tipping gear, with the ram arranged horizontally and operating, through links, a pair of pivoted levers which take effect upon rollers under the body. Practically the whole dead weight of the load must be directly raised at the commencement of the lift, by reason of the ram pressure being applied near the center of the body. As in other hydraulic systems, oil is used as the medium, the pump being engine-operated through special gearing and a flexibly jointed shaft.

The Daimler system has the advantage that no screw gear is necessary, but it is doubtful whether hydraulic lifting sets will obtain much favor for the average class of work, the additional cost and complications, the liability of leakage and of damage from grit seem to make the system not worth while, considering the small percentage of running time occupied, even with hand-operated gear, in the process of tipping and returning the body to its normal position.

The Bulkhead System.—The majority of British tipping bodies are built up of wood with iron stays, but for the carrying of road stone and similar material, the all-steel type is displacing the other.

One type of all-steel body has no tipping gear, but to enable a load to be dumped quickly, either the whole or a part, there is a series of "bulkheads" which can be drawn rearwardly by a cable gear. Thus a 4-ton load of road stone, for example, can be unloaded either in sections at different points or all at one place. As each bulkhead clears the rear end of the body, it swings over the back until it assumes an almost vertical position, held by pivots in line with what is normally its lower edge.

Thornycrofts make a specialty of a municipal outfit consisting of one chassis with a double-purpose equipment. For normal use, in the daytime, the chassis has a tipping body for garbage collection. This body can, however, be replaced by a 750-gal. watering tank for street cleaning during the night. Some scores of these outfits have been supplied to London municipal authorities, some of them having been in use for several years before the war. The chassis is the makers' 3½ to 4-ton truck type, with a four-cylinder 4½ x 6-in. engine.

It need hardly be said that the foregoing does not exhaust the list of purposes to which British motor truck chassis are applied for municipal purposes. They are widely used to carry extending towers for repairing the overhead cables of street car systems. Many municipalities are running services of motor buses, while street watering carts pure and simple are in evidence in urban districts where flushing and rubbering is not possible on the rolled granite roads. A few city engineers have tried electric trucks for garbage collection, but in this work most authorities still find it more economical to use horse vehicles owing to the short journeys and frequent stops during the loading up. There is nothing resembling the elongated garbage trucks used in America.

Refractory Crucibles

DURING the past month the making of crucibles from highly refractory oxides and minerals has been investigated by the Bureau of Standards. It has been found possible to make such crucibles without the use of clay or binder, which would tend to reduce the refractoriness of the finished product. One method is to make the crucible with the use of water by tamping the plastic mass inside of a fire clay mold lined with plaster-of-paris. When the mold and crucible are fired to a red heat, the plaster-of-paris disintegrates and permits the crucible, which is then fairly strong, to be removed from the mold. The crucible is then fired to a high temperature in order to give it the necessary density and strength. The other method is to mix linseed oil with a refractory oxide and then to shape the crucible inside a detachable metal shell; the crucible is then baked in the shell in a core oven, a similar process to that employed in the baking of cores for castings. After the baking, the shell is removed and the crucible fired to a high temperature, which results in a burning out of the temporary carbonaceous binder and a sintering of the refractory oxides, thus forming a dense, strong, and highly refractory crucible. Working in this way, crucibles have been produced from titanium dioxide, zirconium dioxide, and carborundum fire sand.

New Mexican Government to Encourage Automotive Sales

The new government in Mexico believes their country has enough food to insure peace and prosperity, but looks to motor trucks to distribute it. Reduction of import rates and elimination of taxes on automotive vehicles are two moves which will come soon to aid automotive sales.

By Harry H. Dunn

NEW ORLEANS, May 20.

MEXICO is to become one of the greatest fields in the New World for the American truck, tractor and passenger car, if plans being formulated by the civilian branch of the new government of that country are carried through. These plans bear the approval of Gen. Alvaro Obregon, who recently took over the federal government at Mexico City; Alfredo de la Huerta, president ad interim of the country; Gen. Salvador Alvarado, representative at Washington of the new government, and of Gen. Plutarcho Elias-Calles, former governor of the state of Sonora, whose secession from the Mexican federation marked the opening of the recent successful revolution against the government of Gen. Venustiano Carranza.

Mexico contains 800,000 square miles of territory, with a population of approximately 15,000,000, largely residing in rural districts or in small villages, mainly agricultural in its life, though in the north much of the labor is devoted to mining. One of the great drawbacks to the development of Mexico has been lack of transportation systems. The merger of the railroads into one system in 1908-09 accomplished a great deal, but the leaders of the new government realize that a national system of improved highways must be put into operation before there can be free and easy communication between all parts of the republic, and before the people can dispose of their produce to the best advantage, the more fertile and more highly cultivated sections of the republic, such as the south and central parts, feeding those which are less productive, such as the north, northwest and northeast.

Having lived in Mexico for a number of years, I took great interest, during and after the recent meeting of revolutionary leaders in New Orleans, in discussing with some of them their plans for the restoration of the country to a working basis after ten years of revolution. Among those who met in New Orleans in May were Rafael Zubaran Capmany, financial agent of the revolution, and personal representative of Gen. Alvaro Obregon; Salvador Alvarado; Heriberto Jara, former Mexican Minister to Cuba, and several others.

The consensus among all these leaders seemed to be that Mexico has had enough of war; that 15,000,000 of her people are tired of being dominated by 150,000 men at arms in the shape of a federal army, revolutionists and bandits, and that the immediate problem is one of peace.

I talked for some time with Alberto F. Mendez, secretary for some years to Gen. Pablo Gonzales, and now closely connected with Gen. Plutarcho Elias-Calles, former governor of the state of Sonora, and the man who started the present successful revolution which has just overthrown President Venustiano Carranza.

"One of the great causes of all the troubles in Mexico for the past ten years," said Senor Mendez, "has been and is the fact that Mexico has never, since the establishment of the second republic in 1876, been able to feed herself. This is not because there is not enough fertile land in her 800,000 square miles of area, nor because there are not enough farmers among her 15,000,000 inhabitants, but simply that we have never had a transportation system, covering the entire country, whereby a surplus of food in one district could be sold to advantage in another section of the country. Nothing in the world will restore peace to all parts of Mexico, and make the people contented, as a transportation system which will enable the agricultural section of the state of Sonora, for example, to supply the mining states of Hidalgo or Puebla, with its over-supply of beans, and oranges and garbanzos, or to ship the sea food products of Guaymas and the Gulf of California to the interior states.

"The leaders of the triumphant revolution have decided that this cannot be done by an increase in the present railroad system, which is good enough as far as it goes, but does not reach into many of the richest agricultural sections of the republic. Many of us have spent the last ten, seven or five years in the United States, waiting for the development of the present movement in Mexico, and for the Mexican people to become so tired of war that they would support a government of thinking men determined on peace. During this period of our residence in this great country we could not help but notice the great advancement in road building and in the use of motor trucks for transportation and of tractors for cultivation of large tracts of land.

"We have all drawn a worth-while lesson from this, and as soon as the government is well established in Mexico City—which should be before the end of this summer—Mexico will be thrown wide open to trucks and tractors, and, to a lesser degree, to passenger automobiles from the United States, and, in fact, from all manufacturing countries, while a comprehensive system of good roads from end to end and from side to side of the republic will have been mapped out.

"Present plans, which undoubtedly will go through, are to reduce the import duties on trucks and tractors to almost nothing; to provide railroad transportation for them to remote parts of the republic, from their ports of entry, at very low rates, and to eliminate all taxes on trucks and tractors for a period of ten years, the tax at the end of that period to be only one-fiftieth of what it now is.

"Import duties on passenger automobiles will remain the same on cars costing $2,000 gold, or more, at the place

(*Continued on page* 1218)

Tests on Liberty, Benz and Mercedes Engine Manifolds

The Army Air Service has been carrying out numerous interesting engineering tests at McCook Field. This article reveals the difference in fuel consumption found in using various engine manifolds, power output, however, remaining practically the same in each case.

TESTS have been made at McCook Field under the jurisdiction of the War Department, Air Service, Engineering Division, to obtain comparative data as to the power and fuel consumption possible with the Liberty, Benz and Mercedes manifolds. Comparatively little difference was noted in the power with the different manifolds, but there was a marked difference in the fuel consumption. The Benz manifold gave the best power with poor fuel consumption, while the Mercedes type of manifold gave the best all-around performance.

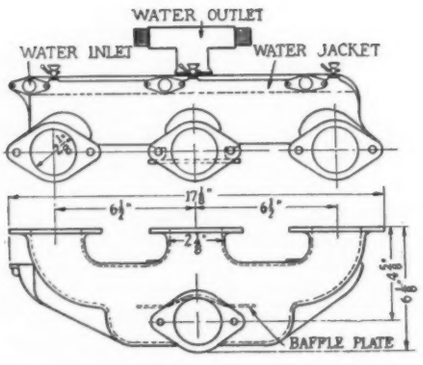
Heating the inlet manifold is necessary to obtain good fuel economy. In making these tests it was desired to obtain a comparison of the form of manifolds alone, rather than a comparison of the complete induction systems of the three engines. No attempt was made, therefore, to duplicate the induction systems of the engines but manifolds were chosen which had the characteristic shapes without regard to the method of heating, materials of construction, etc. The Liberty six-cylinder engine was chosen for these tests, as it is of the requisite vertical six-cylinder type and the available manifolds would fit it.

The photographs and drawings herewith illustrate the characteristics of each type of these manifolds. There are, however, certain characteristics of each to which attention should be directed.

The Liberty type has a baffle plate between the carbureter inlet and the cylinder port. The baffle, however, obstructs the flow of the gases to the cylinders and introduces sharp bends in their path. This manifold is heated by a large water jacket extending over its top, the water entering at three points on the side of the jacket and leaving through a large opening at the top of the jacket. All the cooling water from the three cylinders served by one manifold passes out through that manifold jacket. The Liberty manifold is made of cast aluminum alloy. This manifold and method of jacketing is identical with those of the standard Liberty six and twelve cylinder engines.

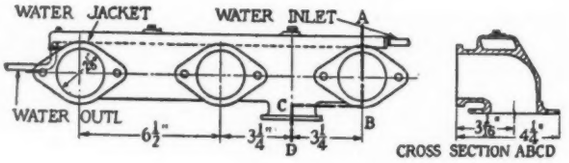
In the Mercedes type, the inlet from the carbureter is between the two inside cylinders served by that manifold. The intake port of the end cylinder is, therefore, farther from the carbureter inlet than the ports of the other two cylinders. There are no obstructions to the gases and all bends are well rounded. In the manifold tested, a small water jacket extends along the top and receives its water from the outlet water pipe of the engine. Only part of the water from the three cylinders, which the manifold serves, passes through this jacket. The Mercedes type consists of a single aluminum casting. The manifolds actually used on the Mercedes engine are built up of welded sheet steel and the water jacket completely surrounds the manifold. The carbureter is also well jacketed and the carbureter intake air is warmed by passing through a passage in the engine crankcase.

The Benz type manifold, as will be noted from the drawing, differs greatly from the other two types. It is much longer and stands vertically rather than horizontally as in the case of the other two. The distances from the carbureter to each of the three cylinders are practically equal. All bends have a large radius so that the path of the gases is very smooth. Unlike the other two types,

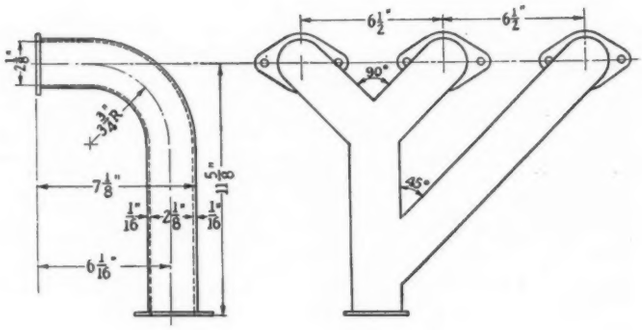


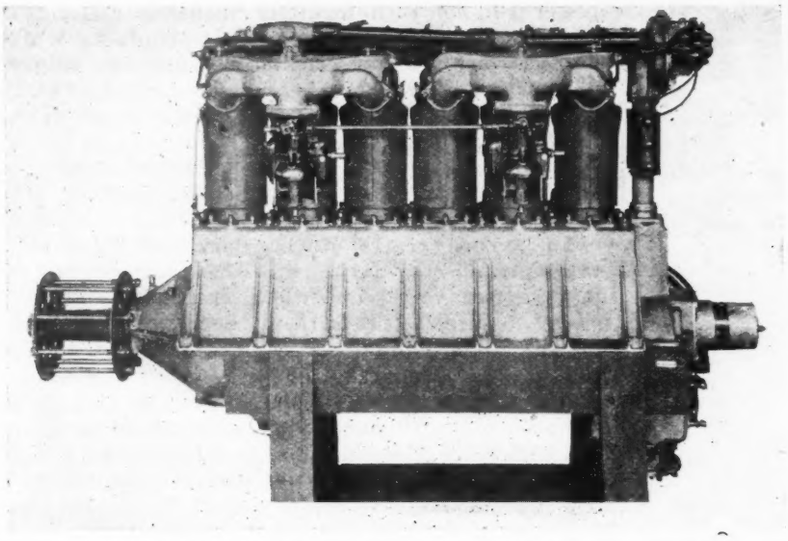
Standard Liberty manifold

Mercedes type manifold

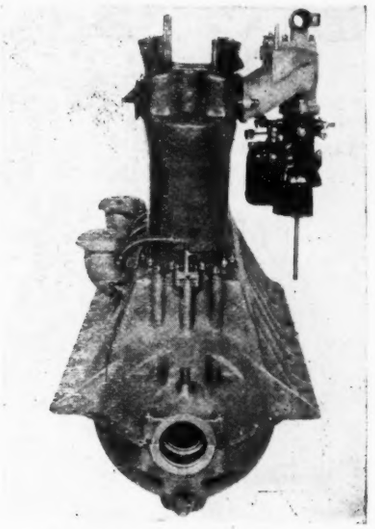


Benz type manifold

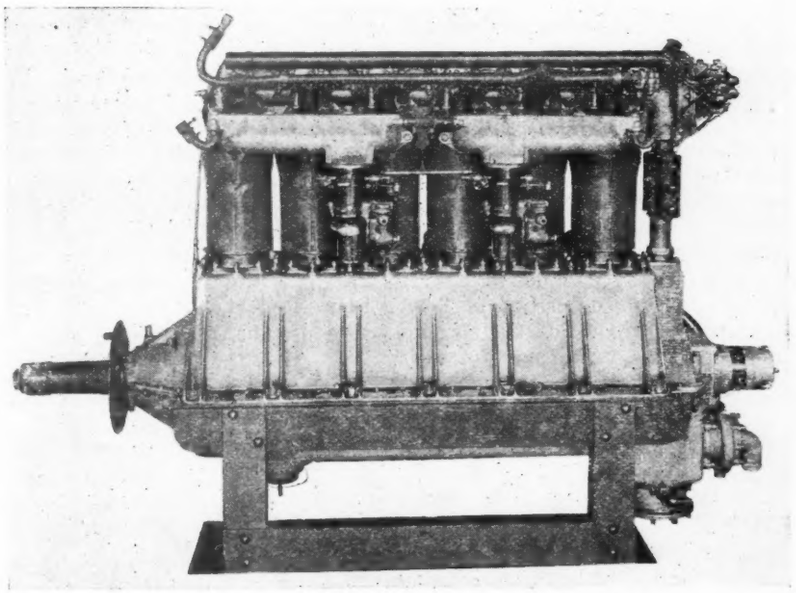




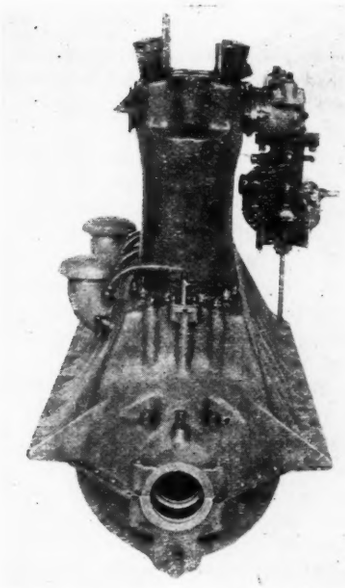
Liberty 6-cylinder engine equipped with standard Liberty manifold



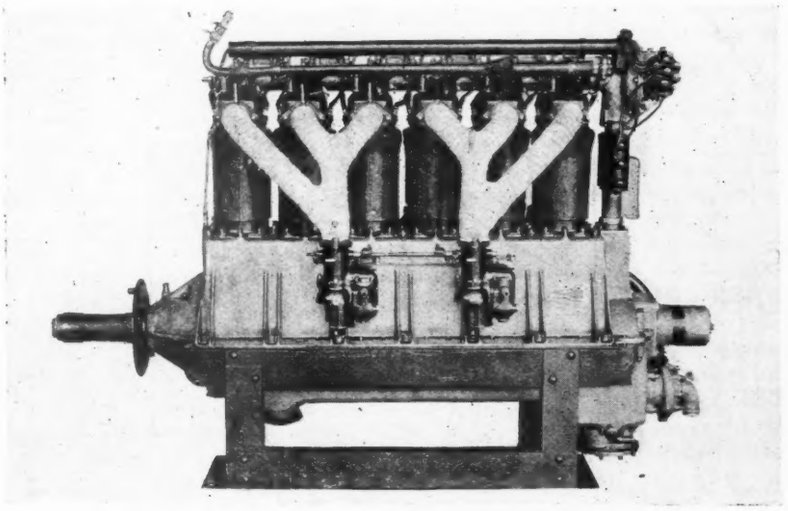
Liberty manifold, front view



Liberty 6-cylinder engine equipped with Mercedes type manifold

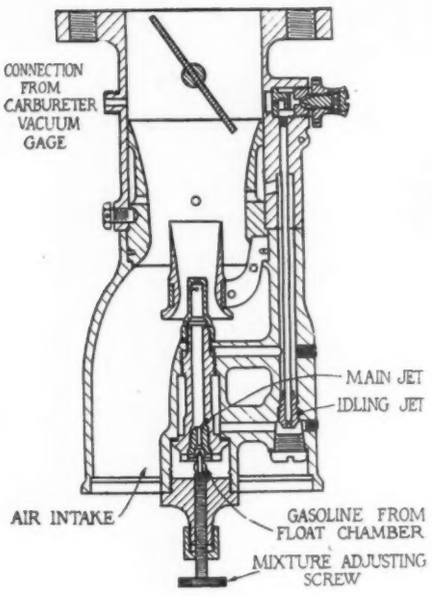


Mercedes type manifold, front view



Liberty 6-cylinder engine equipped with Benz type manifold

Benz type manifold, front view



Type of Stromberg carbureter used in tests on manifolds

this manifold is not water jacketed or heated in any way. It is, however, wound with asbestos tape in order to prevent heat transfer through the walls. This manifold is built of steel tubing acetylene welded. The model used on the Benz engine is almost identical with the above, but it is used in connection with a thoroughly water jacketed carbureter and the incoming air is pre-heated by passing through the bearing webs of the crankcase.

In all the tests, a Liberty six-cylinder airplane engine, built by the Thomas Morse Aircraft Corp., was used. This engine was fitted with standard equipment, as described in this report, with the exception of the carbureters and manifolds.

Two Stromberg type NA-S5 carbureters were used. As shown in the drawing, this carbureter operates on the usual Stromberg principles and is similar to the carbureters used on the Hispano-Suiza engines, except that it is of the single rather than the duplex type. For the test, a needle valve was inserted in such a position as to control the effective opening of the main jet. (See drawings.) By means of this needle, the mixture ratio could be changed to suit each type of manifold. The setting used in these carbureters was as follows:

Diameter of large venturi (choke), 1 9/16 in.

Main or accelerating well jet No. 49 drill size.

The general plan of the tests was to compare the power and fuel economy of the engine when using the three types of manifolds. To this end, the following program was carried out, and with each type of manifold the following runs were made:

First Series (Water jackets of Liberty and Mercedes manifolds in use—Benz not jacketed):

1. 2 full power runs.
2. 1 friction horsepower run.
3. 2 propeller load runs.

The valves of the engine were then re-ground and an attempt was made to conduct a full power run on each manifold with the manifold water jackets disconnected. The engine (manufacturer's No. 4) did not come up to power and was found to be generally in poor condition. Another engine (manufacturer's No. 5) of exactly the same type was therefore substituted and the following runs were made.

Second Series (Water jackets of Liberty and Mercedes manifolds disconnected—Benz not jacketed):

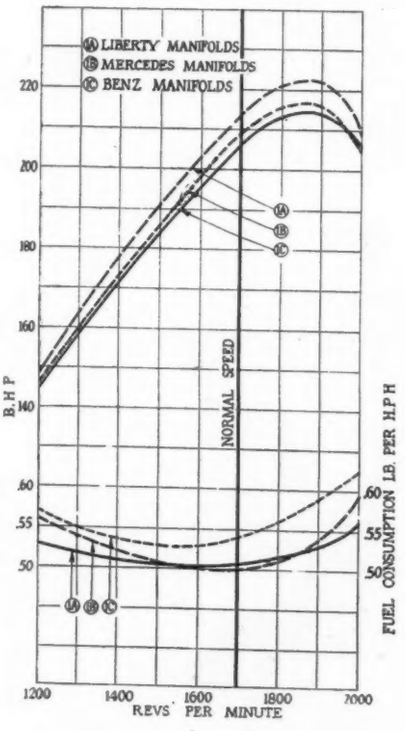
4. One full power run.

The water jackets of the Benz and Mercedes types were disconnected during the second series run in order that the tests might show the characteristics of the shape of the manifolds only without regard to their method of heating. Following these runs, a frictional horsepower run was made as a check on condition of second engine.

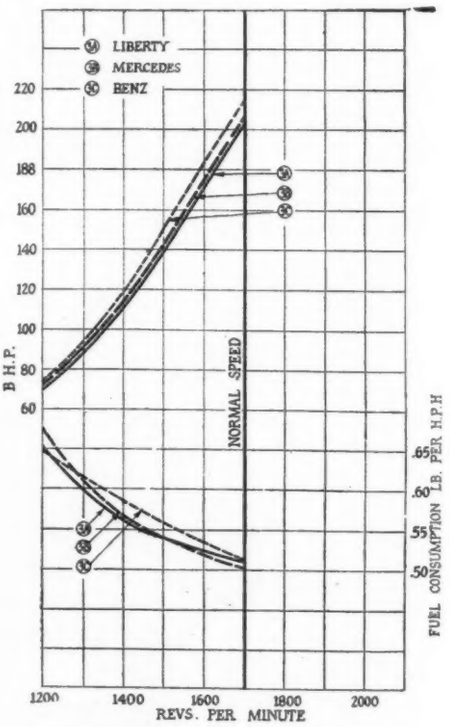
In all of the tests, one manifold of each type was equipped so that the manifold vacuum could be taken near the inlet ports of each of the three cylinders, and also at the carbureter just below the throttle valve. These readings were taken by means of a mercury manometer.

Before each run of each manifold, the special carbureter needle valves were adjusted to give the best possible performance with that manifold, the method of adjustment being as follows: The engine was brought up to full power at normal speed (1700 r.p.m.) and the carbureter altitude control was set in its middle position. The adjusting screw on each carbureter in turn was then opened to the full rich position and gradually closed until the brake load reached its maximum value. After reaching this point, the adjusting screw was closed until the leanest setting possible, without reducing the brake load, was obtained. After the adjustment had been completed, the desired run was made in accordance with the standard method in use by this laboratory, which is completely described in Power Plant Report No. 69.

For the second series of runs, one side of each carbureter air intake was cut away in order to give, if pos-



First series, fuel power comparison Liberty and Mercedes water-jacketed and Benz manifold not water-jacketed



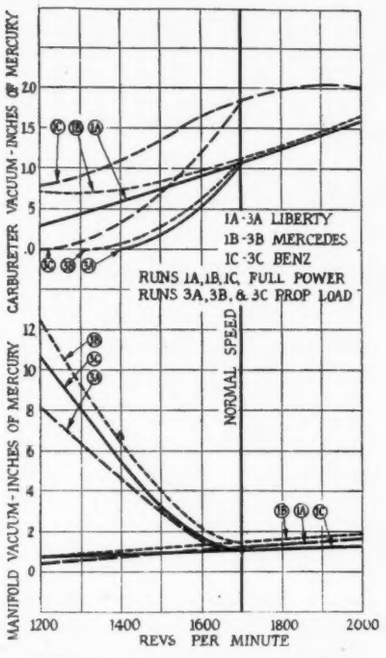
Propeller load comparison curves. Liberty and Mercedes manifolds heated, Benz not heated

sible, an easier path for the incoming air. This change introduced no appreciable change in performance, however.

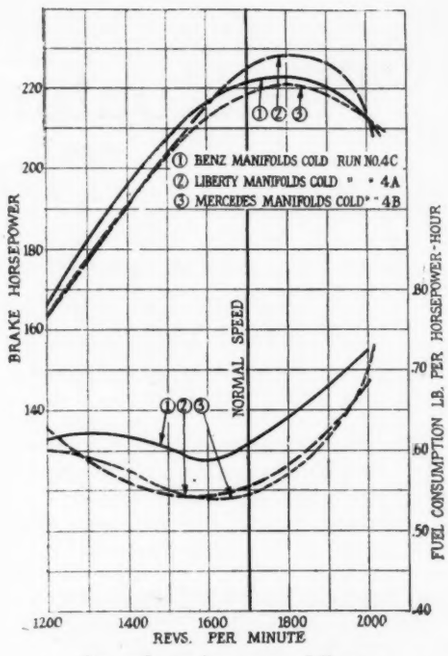
Particular care was taken after the carbureter had been adjusted to note the color of the exhaust flame, as this is a good indication of whether or not the cylinders are being furnished with an equal and sufficient amount of fuel. The temperature of the vapor in the Mercedes type manifold was taken by means of a mercury thermometer at several speeds, with and without the water jacketing.

The results of the tests are given in detail by the curves. Attention is particularly directed to the comparison curves.

It is impossible to compare the first series runs with the second series runs as they were made on different engines. The weather conditions must also be considered in comparing these tests, as the air temperature will vary considerably and, therefore, the power results will vary. Correction is not made in the tables of data for the air temperatures, as no reliable method for such correction is available. The correction for the barometer, however, is made.



First series run, manifold and carbureter vacuum comparison, full power and propeller load with three types


① BENZ MANIFOLDS COLD RUN NO.4C
② LIBERTY MANIFOLDS COLD " " 4A
③ MERCEDES MANIFOLDS COLD " " 4B
BRAKE HORSEPOWER
FUEL CONSUMPTION LB. PER HORSEPOWER-HOUR
NORMAL SPEED
REVS. PER MINUTE

Second series run, Liberty, Mercedes and Benz manifolds without heating

The friction horsepower figures taken with each manifold during the first series show the engine to have remained in good mechanical condition during these runs. The friction of the second engine indicates that it was also in good mechanical condition.

Casinghead Gasoline Impossible for Altitude Work

CONSIDERABLE trouble was experienced by Major Schroeder during his altitude flights at McCook Field on account of the failure of his sylphon pump to deliver gasoline to the carbureter at high altitudes. Upon installation of the Schroeder flowmeter in the gasoline feed system, he discovered boiling of the gasoline at altitudes from 6000 ft. up. This was indicated by bubbles appearing in the glass tube of the flowmeter at about 6000 ft., these bubbles increasing in number and size with the altitude, finally resulting in breaking the suction of the pump and consequent failure of the pump itself.

Experiments in the laboratory of the Materials Section, Engineering Division, reproduced this situation exactly on reducing the pressure on the gasoline to pressures corresponding to that of the atmosphere at various altitudes, and an analysis by the distillation process showed the fuel to be casinghead gasoline rather than straight run. As casinghead gasoline has a much lower boiling point than called for by specifications Nos. 3511-B, covering domestic, 3512, export, and 3513-A, fighting gasoline, the conclusion was immediately reached that a fuel having a higher initial boiling point and, consequently, conforming more closely to the specifications would stop the boiling that had been experienced.

Consequently, a gasoline conforming to specification No. 3511-B was ordered from the Sun Oil Co. It was used by Major Schroeder in his last two flights with no trouble whatever due to boiling. The matter of condemning the fuel used at McCook Field on the ground of not meeting specifications had been under consideration for some time, but had not been decided upon definitely, as it was something of an advantage to be able to use the ordinary high test gasoline on sale at all filling stations. However, this instance, together with trouble experienced in the Dynamometer Laboratory and increasing complaints about evaporation losses at the hangars, led to condemnation of the casinghead gasolines and immediately increased the fuel quality to the point where they now meet specifications.

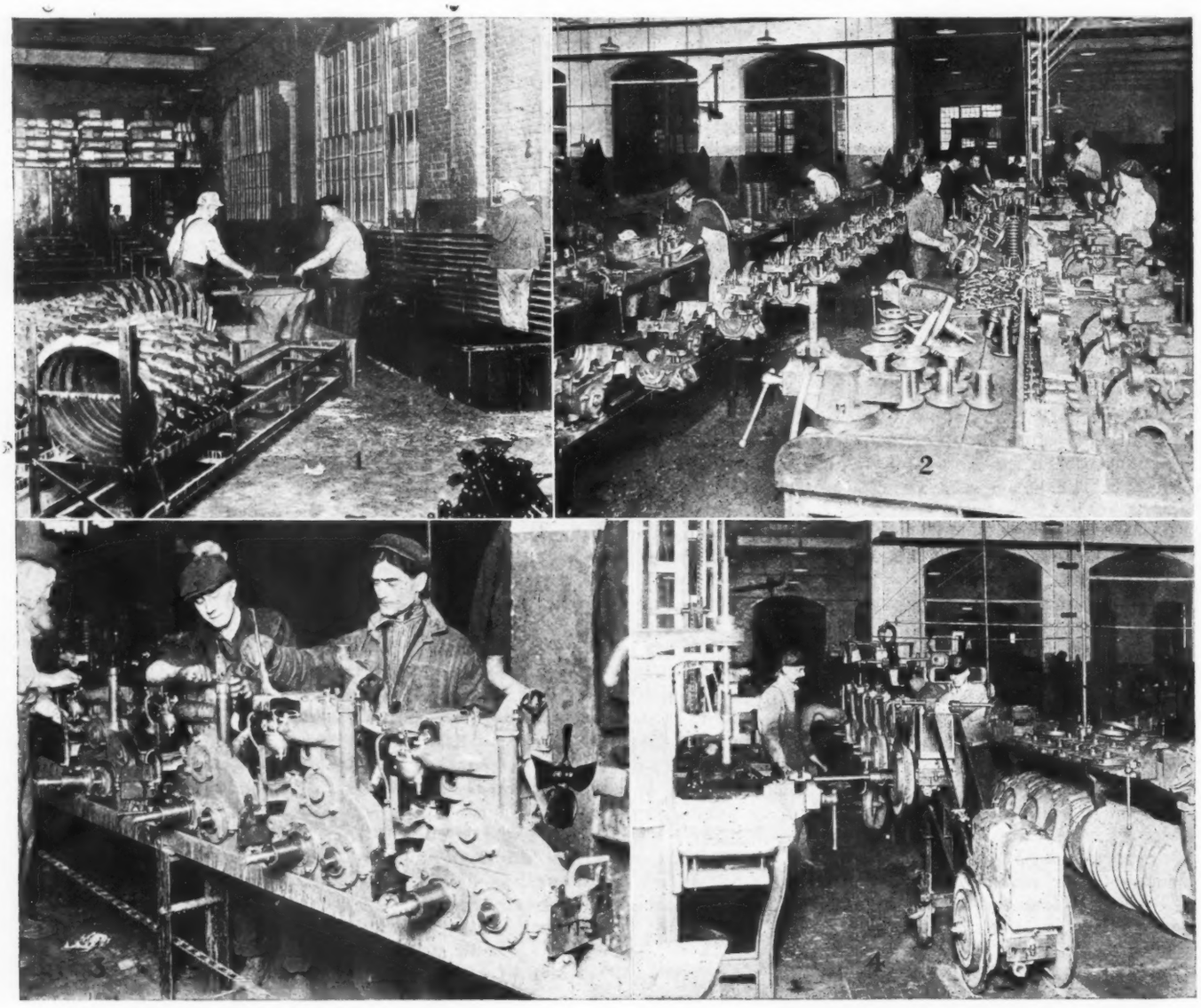
The principal lesson from this series of experiences is that the Air Service personnel erroneously regards a gravity of 65 deg. Baume, or specific gravity of 0.721, as proof of the good quality of the gasoline. As a matter of fact, two gasolines, one straight run and the other blended casinghead, can be given identical specific gravities and still have very different distillation curves. The casinghead gasoline will show considerably greater loss by evaporation before it gets to the carbureter of the plane, and considerably less power delivered in the motor after it gets there, than does the straight run gasoline.

Inspection of specifications Nos. 3511-B, 3512 and 3513-A will disclose the fact that specific gravity is not named as a requirement of either of the three gasolines, but that entire dependence is placed on the distillation curve. Specific gravity is of value only in distinguishing between straight run gasoline of the same base and is of no value whatever in determining the quality of the gasoline unless it is known beforehand whether the gasoline is from a paraffine or asphaltum base, and also that it is a straight run gasoline. The distillation curve, on the other hand, is a sound basis for judging the relative values and is the only known, reasonably short test.

The Routine of Assembling a Small Tractor in Quantity

Success in quantity production of small tractors depends largely on the division and apportionment of minor operations. A simple work-slide placed lengthwise on an assembly bench will expedite production, enabling each worker to do his bit. The methods are entirely progressive.

THE illustrations show the routine of assembling in quantity small tractors for use in gardens and on farms of limited acreage. This type of machine develops about 1½ hp. at the drawbar and an average of 4 hp. at the belt. The particular tractor shown is known as the Utilitor, manufactured by the Midwest Engine Co. A general idea of the method of handling the production problem can be had by a study of the successive operations indicated. In work of this nature, however, several operations frequently merge into one



1—View of rim and hitch paint shop. The rims and hitches are dipped and then conveyed immediately to drying ovens in the background. 2—Sub-assembly and final assembly track. The cylinders are assembled as well as crankshaft and clutch assemblies. 3—This shows the carbureter being adjusted, the cylinder head being bolted, and the job being painted. 4—The radiator is put into place, the hood bolted on, bull wheels, flywheels and handle bars are added and the machine finally is limbered up by an electric cranking outfit

another to such an extent that distinction is difficult.

Fig. 1 shows a corner of the rim and hitch paint shop, where the rims and hitches are dipped in paint and then conveyed to the drying ovens in the rear. The dipping method of painting has proved quick and effective, working out particularly well with parts having recesses difficult to reach.

Fig. 2 represents the sub-assemblies and a portion of the final track. All of the sub-assemblies are completed on benches and racks adjacent to the final assembly track. A gravity conveyor takes the cylinder sub-assemblies to the track, the valves being added in transit, together with the camshaft and magneto drive-shaft. In the meantime the lower part of the crankcase has been placed on the assembly track and makes its way down that line, receiving the bearings, double clutch assemblies, drive gears, etc.

In Fig. 3 the crankcase is seen assembled with crankshaft, camshaft, breather, fan, belt and other parts. On the extreme left a carbureter is being adjusted, while next to it a cylinder head is being bolted in position. Following that is a painting operation. At the extreme right of the figure a handlebar may be seen, attached to the lower part of the crankcase. Each step, occurring in regular routine, is the result of continued experimenting and systematizing.

In Fig. 4 the tractor has assumed the appearance of a nearly complete machine, although the rims shown in Fig. 1 have not been added. The radiator is in place, the hood bolted on, the bullwheel and flywheel are added, and after a pair of test rims have been adjusted the tractor will be put through a test under its own power. The first two hours of the machine's life are spent in the field, functioning as required under normal working conditions. Then follows a rigid inspection for oil leaks, a horsepower test with a Prony brake and the final painting of a finished product.

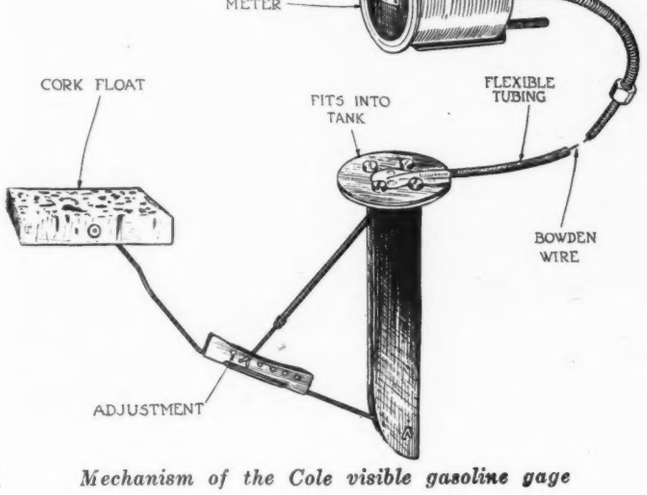
This in brief is the method of production at the factory of the Midwest Engine Co. Probably no two systematizers would make the same division of operations, nor subdivide to the same extent. The old-fashioned one-man built tractor, however, is a thing of the past, and some intelligent division of labor and allotment of tasks have become essential. By such a plan production is not only increased but greatly simplified, thus making possible the rapid adaptation of new men to duties with which they are unfamiliar. A new man in all probability cannot assemble cylinders, but he soon learns to put in a particular bolt quickly, and the man next to him does likewise. Although no one employee may grasp the meaning of each and every step, yet the combined efforts of the force tend toward a common end, so that gradually the machine is assembled.

In the correct division and apportionment of minor operations is said to lie the secret of success in quantity production. Sometimes such operations are subdivided and the work expedited by the simple device of placing a small work-slide lengthwise on an assembly bench. As each operation is completed, the work is slid along to the next man, who in turn does his bit and passes the piece to his neighbor, no conveying machinery being required in the sub-assemblies of a small tractor.

Fuel Dial on the Instrument Board

THE fuel gage illustrated has a dial that can be placed in full sight on the instrument board, if so desired, so that the driver can tell at all times the amount of fuel on hand and can check readily the amount received from a filling station. The calibrations are in fractions of the full capacity of the tank.

A cork float is placed in the fuel tank. This is connected by a Bowden wire and suitable levers to the mechanism of the dial. The dial itself consists of a rotating drum, with the characters F, ¾, ⅝, ½, ⅜, ¼, ⅛ and E, indicating the degree of fullness of the tank. In appearance, the face of the gage is in keeping with the general style of ammeters, oil gages and other instruments located on the panel of an automobile. The manufacturers are the Stemco Engineering Co., and the device is known as the Cole visible gasoline gage.



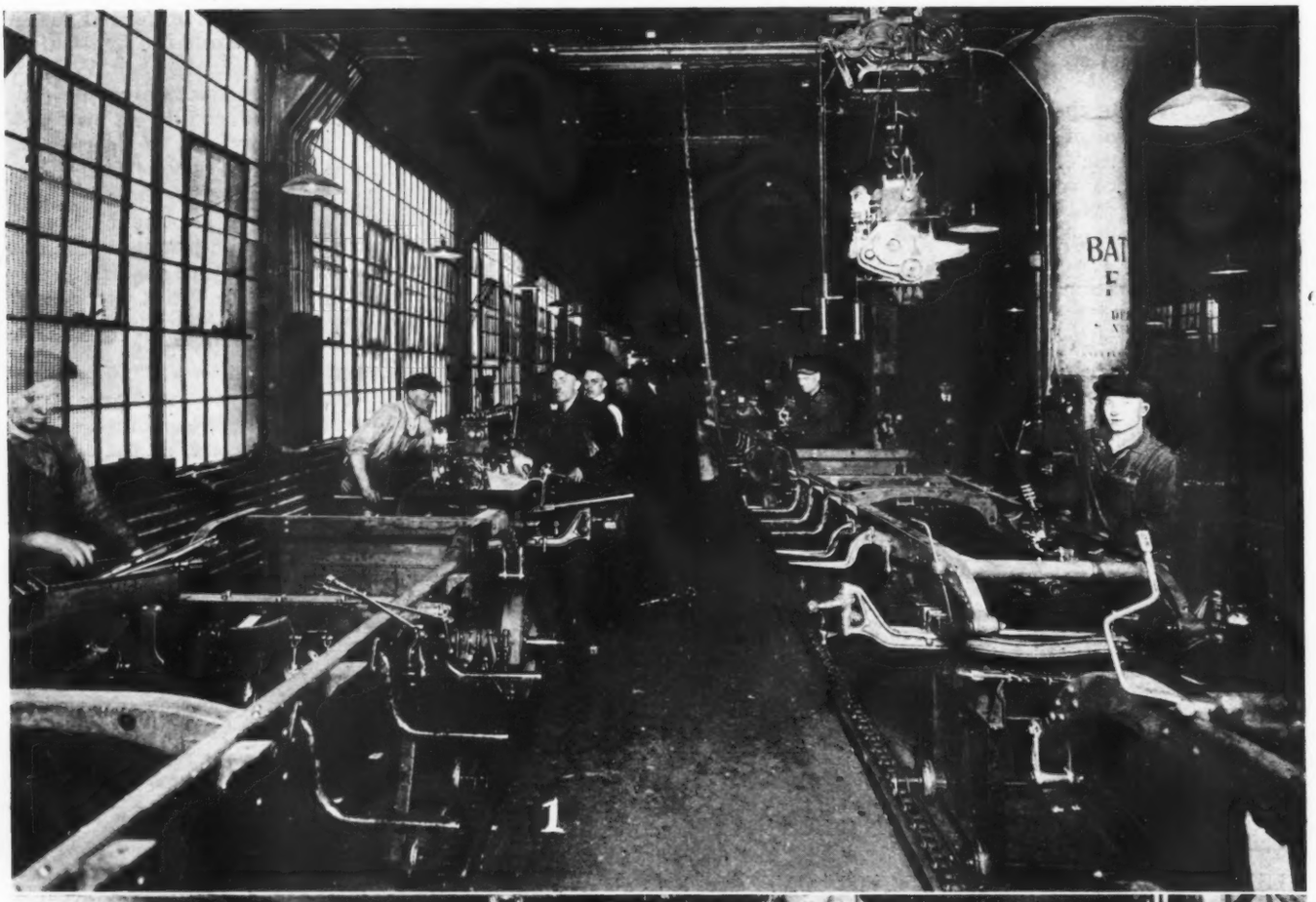
Mechanism of the Cole visible gasoline gage

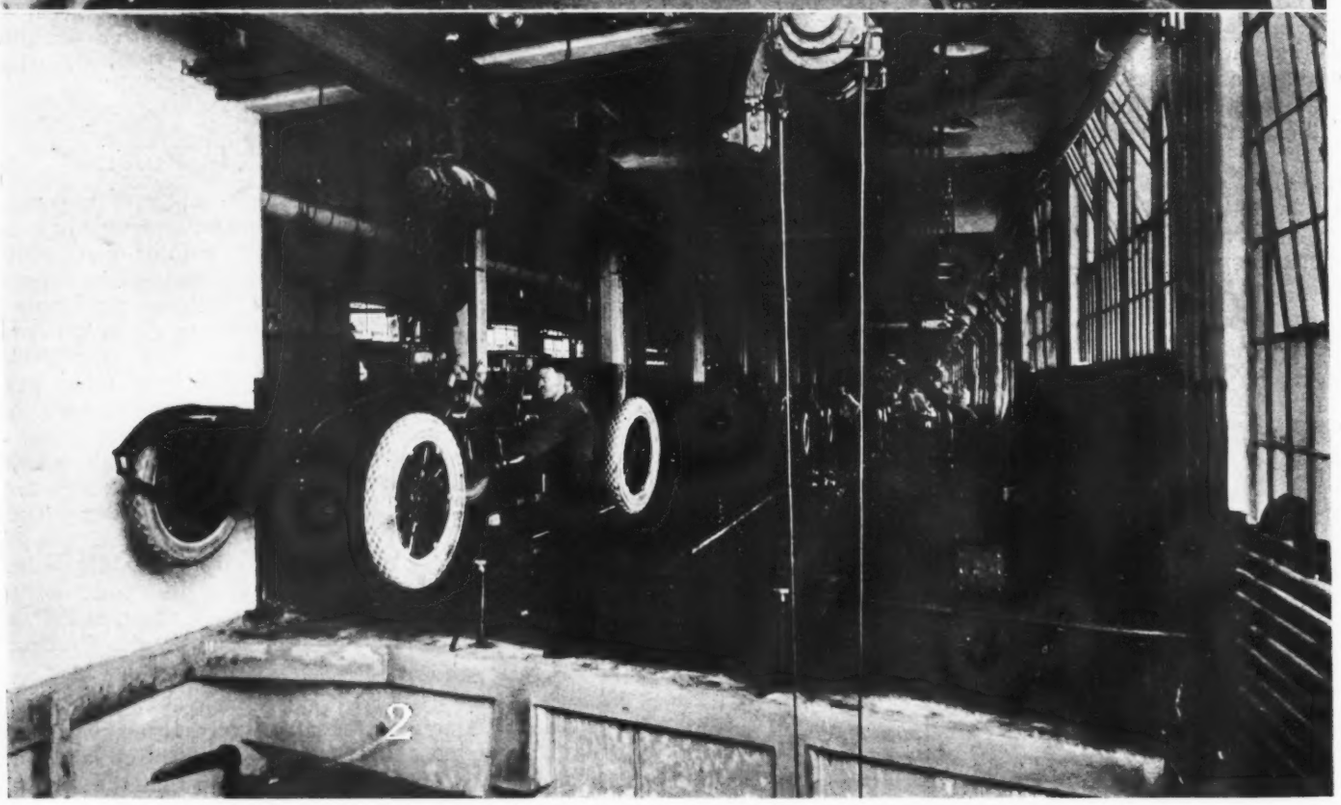
Demand for Tractors in Poland

ACCORDING to a recent French report, there may be expected a considerable demand for tractors in the new Polish state, as that country contains about 9000 farms of 375 acres and over. It is stated in the report that the Fordson concern shipped to its Polish representative (a large hardware merchant at Warsaw) fifty Fordson tractors, the price of which is $650 f.o.b. New York and $800 f.o.b. Danzig. The General Motors Corp. has a general representative for eastern Europe located at Warsaw. This company has offered tractors for demonstration to the Polish Agricultural Society, with offices on Copernicus Street, Warsaw, and two had already arrived at Danzig at the time the report was written. The price of the G.M.C., delivered at Danzig, is $1,000. English, Italian and German firms also are going after the Polish tractor market. One of the difficulties is that the Polish currency is enormously depreciated, the Polish mark being quoted at only about one-half the German mark.

A GROUP of American financial interests has acquired all rights to more than 4,000,000 acres of oil lands in Central and South America. It is stated that the organization has taken effective steps to forestall British control of the petroleum industry, as predicted by E. Mackay Edgar, of Sperling & Co., London.

Enlarging the Daily Output





1—Beginning of the new Hudson chassis assembly line 2—Elevating the assembled chassis to the final assembly floor

Production Expansion Obtained in the Assembly Track Layout

It is an old adage that two blades of grass should be grown where but one grew before. But the Hudson company has increased its production facilities some fifty per cent—from 160 to 250 cars daily—by rearranging the assembly track layout. This article by Mr. Schipper points out the improvements made so that this enlarged output might be obtained.

By J Edward Schipper

BY a rearrangement of the layout of the assembly track of the Hudson factory, the production capacity for Super Sixes has been increased from approximately 160 to 250 per day, or in other words, from 80 per track to 125 per track. In making the new installation, the longest automobile conveyor track in the world has been installed. This is 700 ft. long, its great length being due partially to the fact that the chassis are run through endwise in place of transversely.

It has been found by use of the new arrangement that the power required to drive the track has been materially reduced, in spite of the greater length. A 6-hp. electric motor now easily takes care of the increased production, whereas at least this power was required to operate the older track for about 30 per cent less production.

Some of the greatest improvements are in the way of better carriers, these being equipped with anti-friction bearings and so arranged that they automatically return to position without requiring the attention of an operator. On the old assembly line, it was necessary for the carrier to be pushed back by hand to the head of the chain after the chassis had left it when completed. This, of course, not only required considerable amount of space but also occupied the time of additional men. The new method is more convenient in a great many ways, particularly as there is no space utilized for returning empty carriers and, furthermore, the chassis is easier to work upon, due to the fact that it is running through in an endwise direction and the men do not have to be stepping continually out of the way of the unit, since they can reach it from the side as it passes their stations.

The type of carrier used for chassis assembly is shown in Fig. 1, which illustrates the beginning of the chassis assembly line. It will be noted that these carriers operate on four wheels along a track. The front axles of the carriers are extended and engage with a lug in the conveyor chain. In the former method there was a single conveyor chain running down the center and this, it was found, caused a great amount of friction, due to the pull and twist on the conveyor chain. By this new method, with two chains pulling simultaneously on opposite sides of the carrier, the friction is greatly reduced and, to reduce it further, the wheels or rollers operate upon ball bearings.

As the carriers remain permanently attached to the chain, they are always spaced at the proper distance to take the chassis and there is a tunnel beneath the floor which brings them back to the original starting position without any manual attention. In other words, the spacing and return of the chassis carriers is always correct. Clearance of 4 ft. is allowed between chassis on the assembly line. The chain travels at 33 in. per min. The chassis assembly chain, the beginning of which is visible in Fig. 1 and which is 700 ft. in length, was built by the Hudson company itself, as the conveyor could not be purchased on the open market.

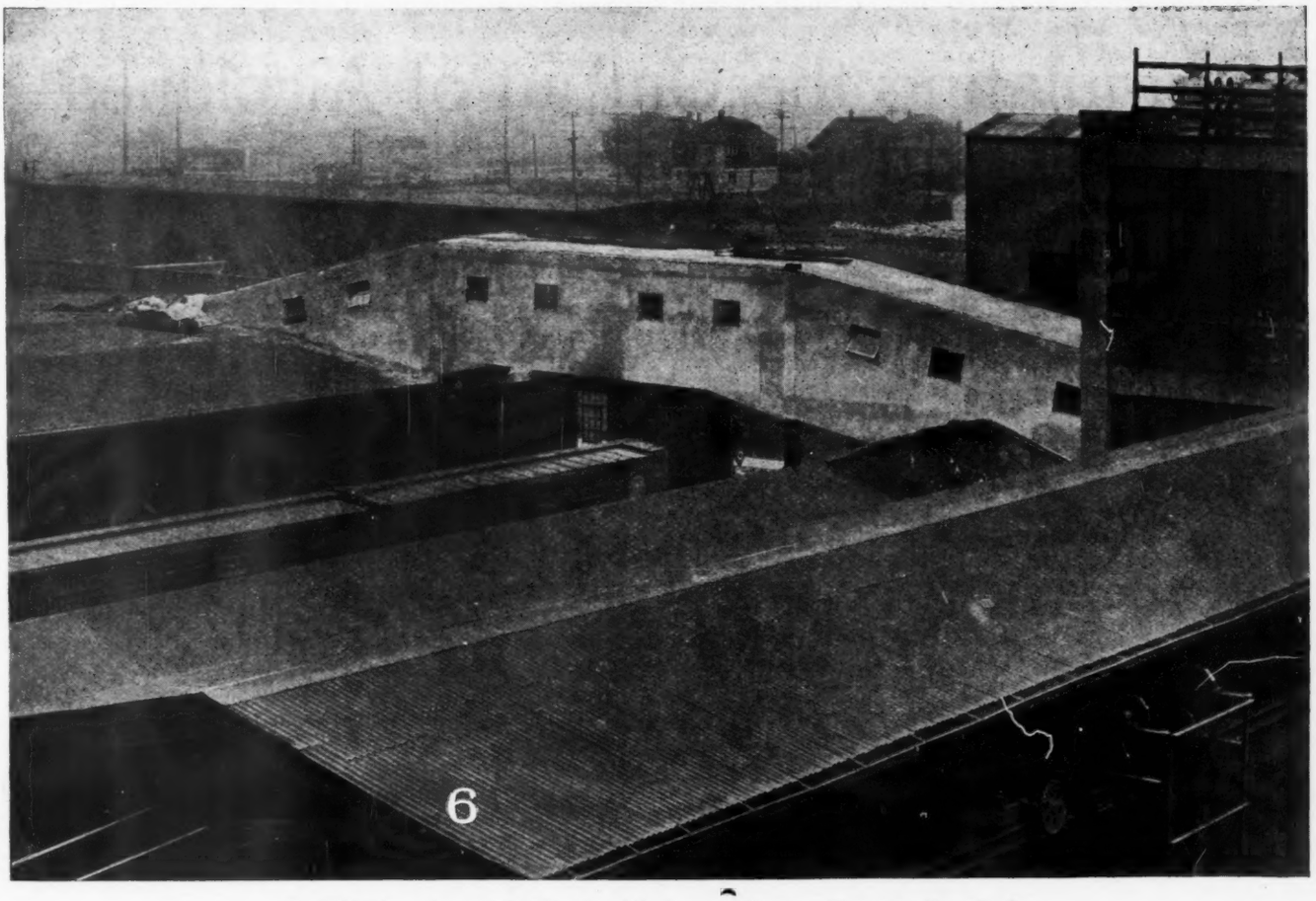
Before being placed upon the conveyor chain, the cold riveting for the runningboard hangers, etc., is completed and then the chassis frame is placed upon the conveyor rack upside down. The springs and axles are put on and it is turned over, after which the engine is lowered into place. This operation is shown in Fig. 1. The swinging of the chassis is accomplished by a swivel arrangement at each end, this being a simple operation since the weight of the spring and axles, being below the center of gravity of the rest of the frame, tends to swing it over with little manual effort. After traveling about 150 ft., the primary work on the chassis is completed and the chassis then passes on a roller chain, which conveys it through the paint spray operation and into the drying oven.

One of the ingenious features of the layout of this new conveyor system is that it has been borne in mind that not only must the chassis progress toward the final assembly but also in the direction of the shipping platform. This has been taken care of admirably. Another feature is the fact that as soon as the operations are completed on the chassis, as far as the primary assembly steps are concerned, it is no longer necessary that the operations should be carried on on the floor and the chassis proceeds up an inclined frame into the drying ovens, which are above. This has two advantages, it keeps the heat away from the floor, making the room more comfortable for the men in summer time, and it also allows of the space beneath the drying ovens to be used for storage. The chassis remains on this balcony through the second spraying operation and the final drying oven.

The wheels are sent down beneath the chassis from the floor above. They are placed on the chassis at the point where it emerges from the second drying oven. The chutes for the wheels are arranged so as to bring the wheels to the desired point from the floor above where the tires are assembled to the wheels and the wheels have been painted, so that there is no necessity for any great amount of wheel storage along the assembly line. After the wheels are put on, the chassis assembly is practically complete and the end of the floor has been reached. At this point, it is elevated to the floor above and starts back in an opposite direction. The first few steps on the upper floor

A More Efficient Assembly Track

3—Start of the final assembly track Note the type of conveyor and truck 4—End of the final assembly line
5—Cars crossing the bridge to the shipping platform



6—Exterior view of bridge to shipping platform. It spans five tracks

are merely completing the unsprayed parts of the chassis, such as the gasoline line, carbureter, spark plugs, pet cock and other small fittings.

The trucks upon which the chassis runs on the upper floor are also of special design and are particularly adapted for handling the chassis after the wheels are in place. Fig. 3 shows these roller trucks clearly. As will be noted, there is a set of wheels upon which the truck itself operates, these being of the ball bearing type, and then a set of upper rollers, spool shaped, which allow the wheel with the tire to settle firmly into place. These are found to be most advantageous, from an anti-friction standpoint, and greatly assist in the mobility of the various units.

When the cars have reached the end of this final assembly line, an inclined track lifts them clear of these rollers so that the roller trucks can return to the beginning of the track through the tunnel beneath. The cars themselves are started under their own power and run off the track down the ramps shown in Fig. 4. In order to keep the cars on the move direct to the shipping dock, a bridge has been built which takes them direct to the shipping platform. This bridge is shown in Fig. 5, from an interior standpoint, and the exterior is shown in Fig. 6. The cars are driven over this under their own power and placed with a minimum of delay direct on the shipping platform. The cars for export are disassembled and crated here and those for domestic shipment are put immediately into the waiting cars wherever possible or, as is the case with a large percentage of the cars under present shipping conditions, they are made ready for driving away.

Radio Flight Direction

THE Bureau of Steam Engineering of the Navy has just completed tests on radio compasses which give an inkling of what may be expected in future aeronautical development. The giant seaplane NC-3 was making a flight from Philadelphia to Pensacola, and Commander J. H. Taylor of the Naval Air Station at Anacostia arranged for a seaplane from there to meet the NC-3. Communication was maintained by the station with both planes and bearings taken until the two machines were within 65 miles of each other. After that the planes communicated and took bearings with each other until they met in flight.

This was the first time that this feat has been accomplished and shows the great value of this radio compass in naval aviation. By this means a fleet of planes can be ordered out from several shore stations or mother ships and meet for concerted action. In addition to this, the fleet will be under much better control of its commander, as he will be able to determine where and when to meet the squadron without a long time-consuming conference on the ground being necessary in advance.

Also, the tests again demonstrated the state of efficiency that the radio goniometer has reached. Although not generally known, the radio compass is used in New York Harbor at the present time to give incoming ships their position when within 150 miles. The same service will undoubtedly be rendered to commercial aircraft approaching air harbors.

Stimulating the Output of Airplanes in America

The United States has need for airplanes to undertake the commercial work of extended aerial mail and transportation lines. But production is dropping, with few planes being constructed for actual business usage as most of the remaining factories have little work other than that involved in the conversion of military machines or additional governmental construction.

THE American airplane industry stands to-day in need of a stimulant to production. Its output has dropped to such a point that something more is needed to pull it over the shoals of the coming months. Already cut to no more than a fraction of its war-time magnitude, the future of that small remainder is now clouded and indefinite, except for governmental work.

The ability of the American factories to produce highly efficient and useful aerial machines, considered from the commercial standpoint, is undoubted by anyone who is at all conversant with the planes of this country and Europe. Numerous models either have been produced since the armistice or are in such stages of development that their completion is no more than a minor production problem. Some of these machines are giving efficient, economical and reliable service in carrying the aerial mails; others are being put to quasi-commercial or sporting use that testify eloquently to their high ability. The army and navy services, employing planes turned out by American factories during and since the war, are continually carrying out difficult flights, all of which prove the possibilities of plane production in the United States.

But construction has lagged. The factories are hard put to find actual sales and the outlets that mean continued business and the real development of the plane as a medium of commerce. Experimental, engineering and production staffs have been cut. Schedules of probable output have been trimmed and factories have turned their machinery and tools into the construction of other products, such, for instance, as furniture. It is said authoritatively that no more than 120 machines have been turned out of the factories of this country in the last nine months and that no more than eighty-one of these were for simon-pure commercial use. A recent estimate that something like 800 would be turned out during 1920 was said to be highly improbable, and it was further thought that no more than 1000, principally of converted military types, were now in flight in this country in other than military use. The factories have been employed almost entirely on governmental work, much of it reconstruction of military machines.

Airplane makers in the chief countries of Europe have been feeling the same pinch that has struck the American industry. Since the armistice, production has been cut to the quick in the effort to keep even with the demand. But it is probable that the slowing down in the United States has been even greater than it was in such countries as England, France and Italy. During the years of the war those countries became really acquainted with the possibilities of airplanes. They were dotted with aviation camps, of all the belligerents, in much greater number than was this country, and their inhabitants became more accustomed to the sound and the sight of the flying machine. Thus, perhaps, due to greater knowledge and wider acquaintance, it is likely that these countries have been "sold" on the plane more strongly than the United States and consequently their peace-time production can be kept at higher levels.

However, regardless of the outcome in other countries, promises are scant here for the continued commercial production and development of these machines, at least before some time has elapsed. Commercial use has been undertaken sparingly and that generally in specialized instances, for specialized purposes or for the carriage of passengers who are willing to pay for their "thrills at the rate of a dollar a minute." This is true, despite the fact that the American aerial mail has developed day by day flight over long stretches of territory to a point not approached anywhere else in the world.

In a measure, the producing companies may be in part to blame for this unfortunate situation. With only a few exceptions they have not begun aggressive selling campaigns and they have not undertaken, or at least only sparingly, the development of several promising features. Among the latter might be included that of night flying, a factor more or less imperative if regular lines are to be operated over many routes in competition with the railroads. Generally, also, the makers have not standardized on models so that production costs might be lowered as much as possible and, similarly, they have not standardized on prices; rather, the practice has been to sell the plane for whatever it would bring and however disposition might be made of it.

The automotive industry has been thoroughly conversant with these facts. Although realizing the value and the necessity for continued plane production, with the attendant experimentation and development that would accompany it, little has been done actually to bolster up this dwindling industry. Automotive engineers and builders have been too busy with their own problems to devote much of their time to such work and, outside of the pioneer aircraft factories which are holding on tenaciously in the hope of an upward turn, only the military and postal services have done much to forward the airplane industry since the armistice ended hostilities.

But consideration of these points now is beside the question. The few companies yet remaining in the field are facing the new problem of meeting the competition of the English war planes that, seemingly, will be dumped on the market at a small part of their original cost. The planes turned over by the British air service for commercial sale totaled some 10,000, with 35,000 engines and other

equipment, according to the best available reports, and at least 25 to 33 per cent of these machines are definitely scheduled for sale in this country. If only that percentage and no more is brought to this country, it will be the equivalent of two to three years of the present rate of the American factories.

It is true that these numerous and cheap planes may popularize a market in the United States and prove a stimulant that at some later date may bring about greatly increased demands. Such a result is claimed as probable by those in charge of disposing of the British machines, but, because of the tremendously low costs and the menace throughout the next year or two, such an assumption may be overly optimistic. It will tend to halt the factories, disrupt them and turn their work into other channels. It will mean a continuation of the sale of military planes which were not built for peace-time service but for war purposes, a service that took no thought of safety, reliability and economy.

The need of to-day is not for these old military machines. They may popularize the sporting element of chance and the "dollar a minute" passenger carriage. But they will not show the way for the establishment of cross-country and other much needed aerial routes that fly by daily schedule and in the conduct of the nation's business.

Experience of the last two years has shown that operation of extensive aerial lines is possible and, likewise, profitable to general business. The aerial mail service has just celebrated its second anniversary, having made a record that puts it in the forefront of such operating successes. Flight has been continuous in recent months across the open water between Florida and Cuba, pointing out further the availability of an aerial mail line along that route.

The commerce of the United States needs airplane lines. It requires rapid transportation for its letters and its rush express shipments. Extensions of the air mail to the Pacific Coast, to the South from Chicago and from Washington along the Atlantic Coast to Florida, linking up with new lines that would expedite communication to the islands of the Caribbean Sea and to Central and South America, are necessary. Routes should be established northward into Canada, and numerous others of extensive scope and of wide service are desirable. The nation's business demands them.

The already existent mail lines show what may be accomplished. Extensions, therefore, can be made almost as rapidly as the authority is obtained. The question is no longer one of experimentation but of established fact.

But much remains before such an aerial mail future can become a fact. One is the organization of the necessary ground services, such as the establishment of flying fields. Efficient ground organization is just as important as the plane itself. That must be attained. Also, commercial planes must be built. Converted war machines will serve the purpose only after such extensive alterations that they almost have become new vehicles. Their ratio of paying load is too small; their landing speeds are generally too high. They are uneconomical of operation, and, consequently, unnecessarily dangerous. Safe and sane planes are needed for these services; a high number of accidents and crashes—which might be expected with these converted machines—would scare off the public that must provide the business to permit of successful operation.

As a matter of fact, too much has been promised and too many hazy schemes have been undertaken. Lengthy plans have been drawn up for commercial service that were certain of failure. In this connection may be mentioned a recent offer submitted to the American Railway Express Co., whose vice-president, R. E. M. Cowie, is extremely desirous of adding an efficient airplane service to that already undertaken by his company. The plan under discussion was for a route from St. Louis to Memphis and New Orleans. It had been prepared in detail and much thought had been expended in preparing it. But it overlooked one factor. Schedules were such that the airplanes would land their cargoes into the terminal cities several hours later than competing trains. It was, of course, turned down by Mr. Cowie.

Commercial lines have been established by optimists who made one or perhaps two flights between two cities and then announced glowingly that they had opened up a new route. Aerial taxicab companies had been heralded as promising continuous and permanent services, and the result has been that the machines made only an occasional cross-country trip, but devoted most of their time to advertising stunts and to taking up passengers who sought only thrills. Actual establishment of real lines will come only when actual commercial planes are produced. The sale of antiquated war machines will do no good. Such selling perhaps will result in harm.

This means, of course, that the American factories must be kept in production. The way to accomplish that desirable end is difficult to point out. The airplane manufacturers themselves have proposed a legislative program which they believe will aid them materially. It asks the following five points:

(1) The enactment of a Federal code of the air and followed by concurrent legislation in all of the several States.

(2) The establishment of air harbors for both land and water craft and the development of a system of meteorological and radio information for the benefit of the small courageous civilian activity that is now being carried on in the air.

(3) The co-ordination in Washington of the various conflicting governmental activities having to do with the purchase, operation or scientific development of aircraft and aerial transportation.

(4) The adoption by the Federal Government of some sort of constructive aeronautical policy which will make it possible for capital to remain in the business and thus assure the maintenance of a basic aircraft industry for the purpose of national defense.

(5) The immediate adoption of protective measures calculated, not to eliminate fair post-war commercial aircraft competition from abroad, but to prevent unfair competition which now threatens in the dumping into this country of the European surplus war aircraft material, part of which has already been purchased by a syndicate at less than 1 per cent of its cost and which consequently can be sold at prices disastrous to the American manufacturers of newly designed commercial aircraft.

But this program, and its sponsors are the manufacturers themselves, is not a cure-all and does not offer a golden way out of the difficulties now besetting the industry. It is an aid and nothing more.

The thing that is needed is the production of machines that will perform successful commercial flights. Such machines must be produced and put into operation. That, after all, is the goal to be sought after—converted war machines will not do the work.

The New Employee as a Vital Factor in Labor Turnover

One plant has found that fifty per cent of its turnover occurs among employees with the company less than two months. Since this is approximately true in general, particular interest attaches to methods concentrating on the problem of tying the new employee to the company.

By Norman G. Shidle

A FEW weeks ago, a calender man in a tire plant went to his superintendent and said:

"I've come to give you notice, Mr. ——; I'm going to quit at the end of the week."

"What's the matter, Smith, don't you like the work?" the superintendent asked.

"Yes," was the reply, "the work is all right, but I haven't been making enough money lately. You can't expect a man to stay around here and work for $8 or $9 a day with gasoline going to 35 cents a gallon."

The plant that has this sort of labor problem to meet has considerable provocation to do what many others have done with much less reason—namely, call Labor unreasonable, give up hope of obtaining a satisfactory working basis, and struggle along with opportunist methods of meeting the labor situation from day to day. The full realization that such a course will inevitably result in decreased production and increased labor turnover is not too common a characteristic.

The rubber manufacturing plant in which this incident occurred, however, has not lost faith even in the face of such occurrences. It believes in the possibility of a satisfactory ultimate solution to its personnel problem through the application of constructive methods. Since definite though gradual progress is being made, it is interesting to analyze some of the features of the labor department work at the Firestone Tire & Rubber Co. plant.

It is common knowledge among employment managers that a large percentage of labor turnover occurs among men newly hired. Statistics at the Firestone plant show that 21 per cent of the turnover occurs among men who have been at the plant less than one week, while 50 per cent of it occurs among those who have been there two months or less. If the problem of tying up the new man to the concern could be solved the turnover would be cut in two.

With this idea in mind, special attention is being given to this phase of the employment work. In a short article it is impossible to review completely the entire scope of the extended labor department activities at this plant but a few of the methods and practices that have been found most effective are of special interest.

To begin with it is necessary that the man be placed on a job he can do well. There are some jobs, for instance, on which a left-handed man is severely handicapped. The foreman, and even the man himself, may not realize this. The result is that the worker becomes discouraged and dissatisfied and quits the plant in a short time. To offset this trouble, the various jobs in the plant have been thoroughly analyzed. The type of man as to size, weight, strength, education, etc., best fitted for each job, has been determined.

When a foreman fills out a requisition for help, he is required to specify these things. This he does on a card similar to the form illustrated in Fig. 1. Another card is in the possession of the employment department which has the job analysis or "standard" in more detailed form. This latter card is used by the employment interviewer in hiring men. With the foreman's requisition and the detailed job analysis, the employment interviewer uses also a picture of the job or operation similar to the illustration in Figures 2 and 3. This photograph is shown to the man, if the latter is unfamiliar with the work which he is about to undertake. Thus the man is shown beforehand the kind of job he is going on and is less likely to quit or want a transfer than when he goes in blindly. Through the comparison of the men with the job analysis, moreover, there is a reasonable assurance beforehand that the man is adapted to the particular work and that he will succeed at it.

After a man is hired every effort is made to introduce him to his work and his associates in an agreeable manner, that his first impressions may be pleasant. The first reaction of a man to the job is extremely important in determining both his attitude toward the management and the length of time he is likely to remain at work in that particular place.

A member of the labor department staff takes the new worker to the department in which the latter is to work and introduces him to his foreman. A small booklet is also given him, containing general information about the Firestone plant and organization. This booklet includes material concerning plant rules and regulations, time cards, absences, the suggestion system, the hospital, the insurance plan, the Firestone Club House and the activities conducted therein and warnings as to safety.

LABOR DEPARTMENT
Requisition For Help

DEPT. NO. _____ TO EMPLOYMENT DIV

REQUIRE MAN ( ) BOY ( ) GIRL ( ) WHEN NEEDED

OPERATION

STARTING RATE _____ SHIFT

D. W. RATE CHANGE

NATIONALITY _____ D. W. OR P. W.

MIN. HEIGHT _____ WEIGHT

STRENGTH _____ SPEED

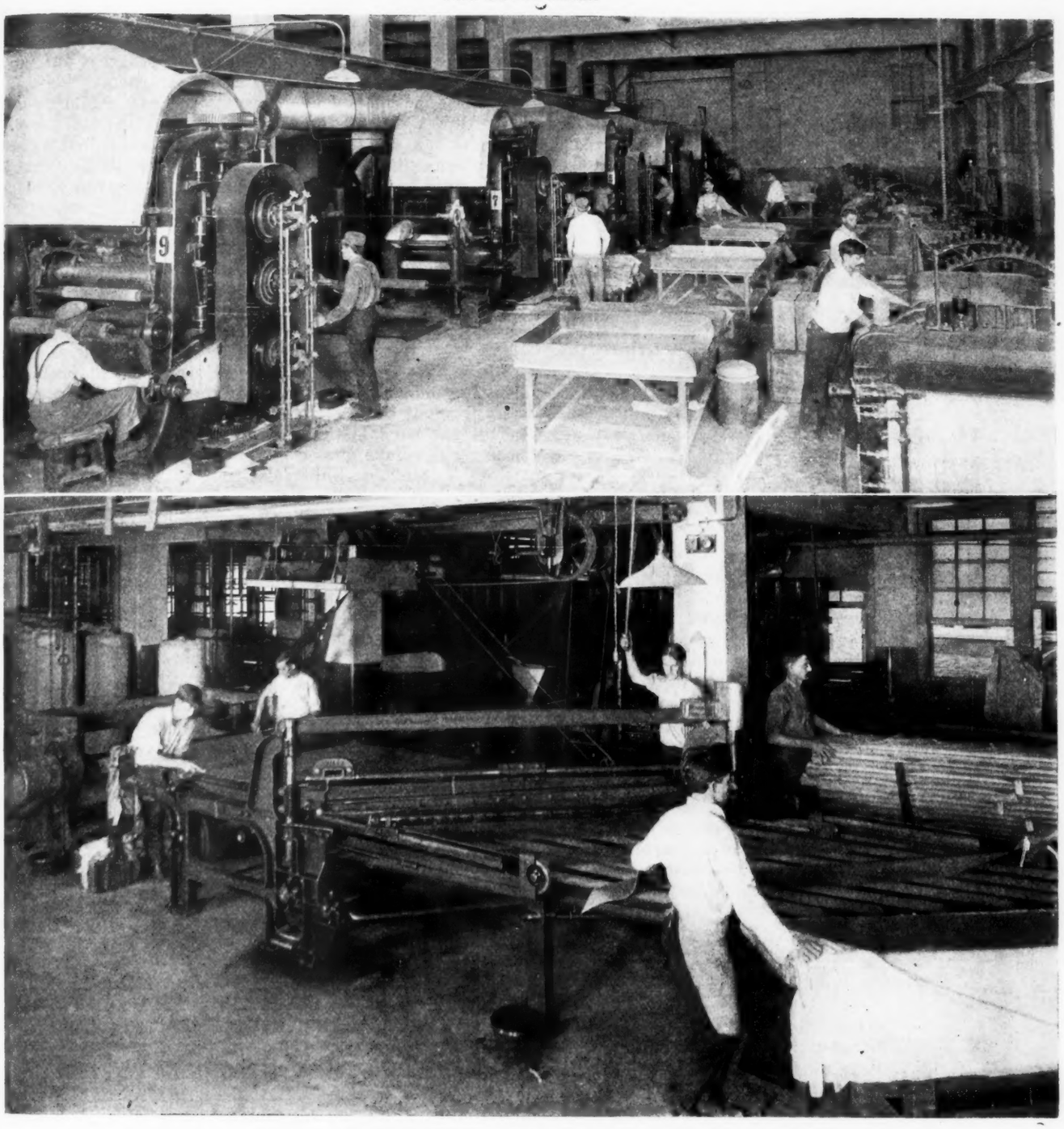
EDUCATION

PERSON RECOMMENDED

REQUISITIONED BY

APPROVED BY _____ DATE

Fig. 1—Requisition for help which includes job specifications and requirements



Figs. 2 and 3—Example of photographs of job shown to new employee. a—Calendering operation. b—Bias cutting operations

With this introduction and information, the new employee is helped over the most difficult period of his employment. He is made to feel at home and to appreciate that he is a part of the organization and industrial family which he has just joined.

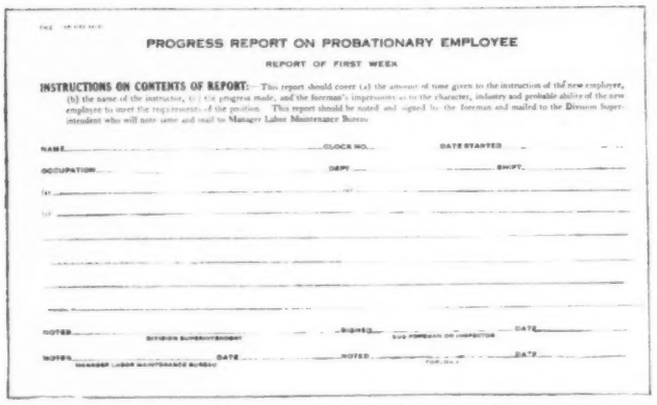
Having started the new employee on the job, the labor department keeps close watch of his progress for a week or two. At the end of the first week it receives a report on his progress from the foreman and the superintendent of the department in which he is working. This report, Fig. 4, indicates the amount of time given to the instruction of the new employee, the name of the instructor, the progress made and the foreman's impression as to the character, industry, and probable ability of the new employee to meet the requirements of the position. The report is signed by the foreman and mailed to the division superintendent, who notes it and then sends it to the manager of the labor maintenance department.

At the time this report is made, the labor department representative interviews the man again. Perhaps he merely drops around to where the man is working, asks how things are going, and offers to help the new employee in any way he can. If the man is not making good on the job, the labor department representative tries to determine the reason for his failure. If not well adapted to the job, he is given an opportunity to transfer to another department or to another type of work.

This interview completes what might be termed the preliminary "follow-up." From that time on the prog-

ress of the man is watched in another way. As in the Goodyear plant, different methods are used to check up and encourage the day-work men and the piece-work men.

The day-work men begin at a given hourly rate and, if their work is satisfactory, are advanced at stated periods. The labor department keeps a record of the


PROGRESS REPORT ON PROBATIONARY EMPLOYEE

REPORT OF FIRST WEEK

INSTRUCTIONS ON CONTENTS OF REPORT:— This report should cover (a) the amount of time given to the instruction of the new employee, (b) the name of the instructor, (c) the progress made, and the foreman's impressions as to the character, industry and probable ability of the new employee to meet the requirements of the position. This report should be noted and signed by the foreman and mailed to the Division Superintendent who will note same and mail to Manager Labor Maintenance Bureau

NAME _____ CLOCK NO. _____ DATE STARTED _____

OCCUPATION _____ DEPT. _____ SHIFT. _____

1st _____

1st _____

NOTED _____ DATE _____ DUPLICATED _____ DATE _____

NOTED _____ DATE _____ NOTED _____ DATE _____

Fig. 4—Progress report on new employee, made out after one week's employment

progress of each man and sees to it that he gets his increase when he is entitled to it.

Just as the day-worker needs to constantly improve in his work if he is to be a contented and efficient workman, so must the piece-worker show steady progress up to a certain point unless there is something definitely wrong. Fig. 5 shows the form on which the hourly earnings of piece-workers, and those day-workers who are about to go on piece-work, are recorded and checked up. The labor department goes over this form from week to week and investigates any case in which a man seems to be making slower progress than he should. Whenever a man is not progressing as rapidly as the average there must be some reason for it. It is the business of the labor department to find out this reason and eliminate it if possible. It is to the disadvantage both of the company and the worker to have the progress and earning power of an employee unduly retarded.

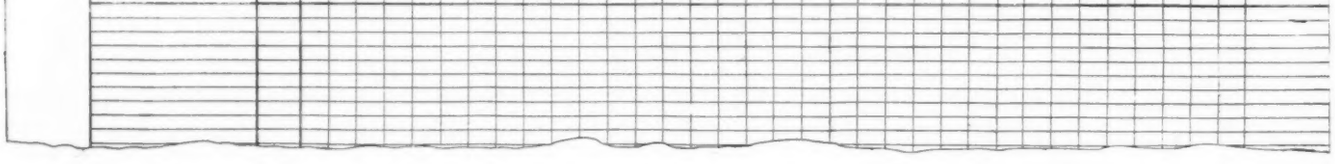
These methods of dealing with the new employee have been in operation for about eight months and the first effects can already be observed. Labor turnover at the Firestone plant has been reduced about 35 per cent in that time and it is felt that the attention given to bringing the new man into the plant, properly placing him and following up his progress has played a large part in effecting that reduction. Other phases of the labor department work, of course, as well as conditions outside the plant have had some part in the lowering of the turnover figure and the gradual progress has been so marked and steady since the introduction of this follow-up work that there is no doubt as to its beneficial effect.

Like other phases of personnel work, considerable investigation and extensive thinking have been necessary to carry out these plans successfully. The labor department has been installed and is operated to do this and the results have more than justified its existence.

W. R. Murphy, superintendent of labor at the Firestone plant, was asked this question: "Is it not true that a large plant like this can afford to have a labor department to do all these things, while a small plant cannot?"

His reply was: "No plant, large or small, can afford to do without a labor department. The labor department does not cost money; it saves money. The personnel problem is the most important one with which the manufacturer has to deal at the present time; he cannot afford to neglect it. A small plant could not have all the various subdivisions of the labor department which we have, and could not, perhaps, go into certain phases of the work so extensively, but it needs a labor department, even though that department consist of only one man."

The labor department, as a symbol and personification of the necessity for investigation and gradual development, is needed wherever men are employed, if the plant is to attain its highest productive possibilities.


ANALYSIS OF STRAIGHT TIME HOURLY EARNINGS ON MAJOR OPERATIONS

Plant No. _____ For Pay Ending _____ 192_

OPERATION | Total Employees

Fig. 5—Sheet for analysis of hourly earnings of piece workers and day-rate workers about to be put on piece work

New Mexican Government to Encourage Automotive Sales

(*Continued from page* 1203)

of manufacture; that is to say, nearly 50 per cent of their value. On cars costing less than $2,000, the import duty will be reduced 75 per cent in order to encourage the man who wants a passenger car to help him in his daily work.

"Import duties on road-building and agricultural machinery also will be reduced to almost nothing, while taxes on them, too, will be eliminated for ten years, and then imposed only very lightly. It is estimated that in ten years a comprehensive system of national highways, radiating from Mexico City, Guadalajara, Vera Cruz, Puebla, Chihuahua, Monterey, San Luis Potosi, and other cities of the country will have been completed.

"An idea is also taking shape for the establishment in the Tampico oil field of a refinery to make gasoline from the vast amount of crude petroleum produced there. If this can be accomplished—and we believe it can—the owner and operator of an automotive vehicle in Mexico will not have to be dependent on foreign refiners, nor have to pay such high prices as at present for his gasoline. Lubricating oils of a good grade are made in Mexico."

Publicity for American Products in the Foreign Field

The export markets of the world must be cultivated by advertising just as are the markets at home. How to prepare such appeals and where to place them are such difficult subjects that a special conference was devoted to the subject at the recent foreign trade convention at San Francisco.

By David Beecroft

HANDLE the advertising of every country as a separate problem and in no wise use blanket policies of advertising when reaching the consumer in foreign fields, was the consensus of opinion of over 300 delegates who participated in the recent conference to consider foreign advertising at the Seventh National Foreign Trade Convention at San Francisco. The question of foreign advertising was considered for the first time by this association at its annual meeting a year ago when a small group session was devoted to it. This year the subject brought together one of the largest of the four groups into which the convention divided itself and for over two hours merchants interested in a hundred different industries assisted one another by hints and examples on how they are handling the export markets.

In reaching the consumer, consider each country as a separate problem.

Do not utilize blanket policies but individualize for each country.

Copy should be written and illustrated by natives of the country to be reached.

A year's campaign in export business publications is necessary to secure dealers and distributers and to build up a merchandising organization in foreign lands.

Personal letters, newspapers, catalogs and photographs should be utilized widely in supplementing the newspaper and magazine campaigns.

When reaching the consumer, the convention was unanimous on what might be designated as the individual policy, that is, treat each country as a separate one, and do not draft copy, plan a campaign or give instructions to duplicate it in a score of foreign fields. In reaching the consumer in Latin America, each country is handled alone, thus Argentina is different from Cuba, Brazil, Chile or Uruguay.

Frank Arnold, of Frank Seaman, Inc., who specialized on foreign advertising in his address, not only advanced this policy, which was generously supported by the delegates, but he advanced the thought that, in the preparation of copy for consumer advertisers, the copy should be written, if possible, by natives of the country to be reached—natives trained in the art of writing advertisements—and Mr. Arnold in many cases would have all illuminating illustrations executed by native artists in his aim to adapt the copy and complete advertisement to the individuals. This could not apply to the illustration of a motor car, a motor truck or other piece of machinery, but rather to illustrations of a general character in which local atmosphere is attempted.

Mr. Arnold's policy of individual treatment for each country requires, in his own words, that "the agency must have a complete foreign organization duplicating in all important details his domestic equipment. There must be a foreign rate and contract department in charge of a man who can read and speak at least three languages, who is expert in converting money quotations into United States equivalents and who can have the oversight of the checking in and filing of the hundreds of foreign newspapers and magazines that arrive each month. This department must be in shape to furnish quotations on space in media published anywhere in the civilized world.

"The copy department should contain only men who have had foreign merchandising and advertising experience—foreign born and capable of writing the advertising message in the language of the country. This department will never translate domestic copy into a foreign language, for experienced men know that a Latin American advertisement must be written in Spanish or Portuguese, a French advertisement in French or a German advertisement in the German language.

"This department must contain a group of foreign writers of varying experience and temperament in order to adequately serve a number of clients with widely differing products. Such a department is difficult to build up, as there are but few men in this country capable of doing the work.

"For art work, there must be the foreign artist, for if anything it is more foolish to try to illustrate a foreign advertisement by the work of an American artist than to attempt to write the copy in English. Such artists, who can both visualize and execute, are not easy to obtain.

"The correspondence and detail departments must also conform to the same general conditions and a knowledge of several languages is essential.

"Take such a foreign department in charge of a man of some foreign travel and of broad vision and, above all, in love with his work and you have visualized before you the equipment necessary to give adequate foreign advertising service. The large overhead expense necessary to maintain such a foreign staff together with the

difficulty in obtaining trained men will probably restrict this service to a minimum number of advertising agencies throughout our country for some years to come.

"There is no mystery surrounding foreign advertising—no more is there any magic connected with the processes of building copy and placing advertising in foreign publications. Given an agency organization such as has just been described and the procedure is identically the same as is followed in conducting a domestic campaign. The only difference is that foreign men do the work and write the copy from the standpoint and in the language of their own country.

" 'But how do you go about it?' some one asks. 'How can I start advertising in the foreign field as a basis for developing into a big advertiser if the results are satisfactory?'

"In reply, let us review in outline a campaign, withholding the names of the advertiser.

"Mr. 'A' manufactures an article of household use with a trademarked name which he is desirous of selling in the foreign field. Before embarking on a world-wide campaign he wishes to try it out in some one field.

"Cuba is selected for the experiment, partly because a branch of his business is located in Havana and also because Cuba is the gateway to Latin America, and, therefore, a good experimental territory. First, a series of conferences were held at which there were present the manufacturer, his sales manager, the manager of his Cuba branch and the agency representative, who fortunately had just returned from a study of Cuban conditions. At these conferences, all the facts and figures were laid on the table, including sales methods, distribution, volume of sales, competition, present and future policy of the company, etc., etc. The resident manager, who had come from Havana for the purpose, reflected the local conditions and made definite recommendations. As a result the agency was asked to submit its recommendations, the expenditure to be within a given sum. The foreign department then made up its schedule of newspapers and magazines covering the principal cities of Cuba on the basis of a six months' campaign.

"In Havana five magazines and six newspapers were selected; in Cienfuegos, two newspapers; in Matanzas, one newspaper; in Santiago, three newspapers and in Camaguey, one newspaper. Twelve pieces of magazine and sixty-four pieces of newspaper copy were prepared. The copy was written and illustrated exclusively by Latin Americans and reflected every possible use of the commodity in the home, shop or factory.

"An experimental campaign like this represented an expenditure of about $5,000 for space."

When the American manufacturer wishes to secure distributers and dealers and build up a merchandising organization in foreign lands, the problem becomes an entirely different one, the media selected are different and the campaign different. Mr. Arnold would select export business publications exclusively and arrange for a campaign of one year. In this work, foreign copy writers would be consulted and a special series of advertisements evolved.

J. C. Culbertson, president of the Wichita Motors Co., which has an export trade in motor trucks in 83 different countries, has used export business publications in securing foreign dealers and he considers them among the commerce builders of the nation. The editor is a trained export salesman who sells advertising plus service, which gives unusual results.

In reaching the consumer in foreign advertising, the campaign would include the use of perhaps several hundred foreign magazines and newspapers, the expense to approximate $100,000. In the capital city of every foreign country is a very reliable newspaper, often two or more, and at times these are national in scope as compared to city dailies in the United States, which are largely local. The foreign magazine is less in number than the American magazine but should not be overlooked.

A practical layout for a consumer campaign in a South American country would be:

"First—A careful selection from the export business publications—eliminating any excessive duplication. This will keep you in touch with the dealer or agent and be helpful as a method of general trade publicity.

"Second—If the kind of product permits, I would use the Spanish editions of such consumer magazines as World's Work, Vogue, Pictorial Review, Delineator and The Field (El Campo), as I believe publications of this type are bound to be of increasing value from the standpoint of the Latin American purchaser of the highest type.

"With these two groups of publications as a background, I would consider South America by countries—each country as a unit by itself. Never make the mistake of trying to cover South America by a single campaign, for no two countries are alike—some differ in language and all in the use of colloquial expressions.

"Of the countries of South America, all but two, Bolivia and Paraguay, have seacoast. Take each country and select two leading cities—usually the capital and a coast city. In each of these cities pick out the best newspaper for your product, for there is the same choice to be made as would apply to any American city.

"A maximum of four newspapers will usually cover any one city—two morning and two evening, if the split comes that way. In the smaller towns or cities, one paper will be enough or at the most one morning and one evening.

"When it comes to periodical literature, you will discover that one magazine or small group of magazines serve a certain territory not necessarily confined to one country and that the total of these groups gives you a magazine circulation which covers South America fairly well. I would add to the newspaper list the representative magazines, not over a dozen in all, in order to obtain this special type of home circulation.

"Examination of a list made out along these lines will reveal a series of separate campaigns, each with the local dealer's name included, the total forming one complete co-ordinated advertising campaign tied together perhaps by the manufacturer's name or in some other fitting way.

"It will also show from seventy-five to one hundred local newspapers and about eight or ten magazines.

" And what would such a program cost?' some one asks. Roughly $25,000 for 12-inch copy once a week in newspapers and one page monthly in the magazines—both for a period of twelve months, or double the space or number of insertions for half that time."

Mr. Culbertson, in his address on his advertising experience in motor trucks, supplemented his export business paper campaign with personal letters, newspapers, catalogs and photographs in securing dealers as well as in reaching the consumer. In reaching the consumer, the local agent in the foreign land shares the advertising expense and, as a result, is a direct aid in preventing waste of money and effort. Mr. Culbertson is a strong supporter of long personal letters to consumer inquiries and told of one instance where a seven page letter secured an initial truck order when 45 other truck makers answered the inquiry by a short formal letter advising that catalogs were being forwarded under separate cover

and further particulars would be furnished if desired. His seven-page letter was accompanied by special photographs.

To carry on correspondence in 83 different countries, Mr. Culbertson finds that five different languages are sufficient to cover the majority of conditions, these being English, Spanish, French, Italian and Portuguese. He is a strong supporter of the individual attention plan to the consumer and in order to keep away from the form letter or anything giving the impression of a form letter, uses six typewriters to care for a part of this work which can be answered by one form of letter. These letters may be six or eight pages in length and accompanied by original photographs.

The direct courteous letter, properly phrased in the language of the recipient, awakens a real interest and frequently makes a direct sale. In these letters it is important to have accurate information on the several conditions surrounding the prospective client, whether he be a wholesaler, retailer or ultimate consumer.

Mr. Culbertson gives special attention to consumer copy.

"This class of copy must be specific and accurate in its relation to local conditions and an intimate knowledge of the country is necessary. This branch of advertising is of great value to the local agent and quickly creates a consumer demand. We use these mediums where we have good agents and we depend, in a large measure, on the judgment of our local agents in selecting media and preparing copy. As a general rule, the local agent shares in the expense and is directly interested in preventing waste. He knows exact conditions and what days of the week give best results and handles it better than any advertising agent in the United States can.

"In all of the above periodical advertising, we pay close attention to the preparation of copy. The translation to foreign language is the work of experts in our own organization. Translation bureaus cover a general line of subjects and many times fail to get the correct idiomatic expressions that put punch into the copy.

"We pay particular attention to the compilation of export catalogs, circulars and folders. Photographs for use in making cuts are carefully selected. We insist on good engravings and a quality of paper that will give good reproductions. The value of good illustrations is too well known to need any particular emphasis here. Knowing this value, we frequently use original photographs to accompany personal letters.

"Our export catalogs must be very complete. We avoid the use of bombastic descriptions and superlatives. We carefully describe our product and make our product measure up to these descriptions. Quality advertising goes hand in hand with a quality product and advertising has no power that will bring repeat orders for an unsatisfactory commodity.

"We have found the use of our own house organ of great value. It brings our clients into closer relationship with our organization. At intervals, we run illustrations of our officers and department heads, views of the factory, and the men at their work. Our clients send us photographs from distant lands and we use these in connection with articles describing unusual uses of our product in far away countries. We issue our publication in several languages and we give particular attention to its compilation and general appearance."

Advertising in the Far East, particularly in China, was introduced by W. E. Row, Shanghai, who was one of several Chinese delegates, made up of English-speaking trade men in China and Chinese business men. China has been much in the convention eye. Standard Oil, Singer sewing machine and many other big organizations have been devoting special attention to the 400,000,000 inhabitants of that old empire. This convention by virtue of being held in San Francisco constantly brought the Far East into prominence. Considerably more than 60 per cent of the total population of the world lies beyond the Pacific and there are many business men who firmly believe that the center of trade in the not too remote future will shift from the Atlantic to the Pacific. These tradesmen, and they are generally of world experience, cite the continual movement of trade eastward from the Persian Gulf to Egypt to the Mediterranean, to Spain, England and United States and now look to its centering on the Pacific.

The great awakening of Asia that followed the victory of Japan over Russia in the Russian-Japanese war passed through every nation of Asia. The thought of Asia for the Asiatics came into the consciousness of the peoples. New movements started in nearly every Asiatic nation and the movement in China by the young Chinese was perhaps the most considerable that took place. The school system has been revolutionized since then and a new life has taken possession of the people. Recently Standard Oil put on a nation-wide selling campaign which pushed the use of kerosene for house lighting to all parts of the country. This has been considered very successful and the educational results that must follow will help on the general Chinese movement.

At present China is a difficult country to reach in a consumer advertising campaign. It is scarcely possible to reach the 400,000,000 inhabitants in any campaign. Newspapers are not on a par with the press of the European or western world. Too frequently the press is used for government propaganda. The publications are too largely political in character. Advertising rates are very low.

Perhaps in no other country is the registered trademark of greater business value. With many commodities, such as cigarettes and package merchandise, a big percentage of the people buy solely by the trademark. The color of the trademark must not be changed, there being examples of where a change in the color from red to black has lost the entire value of the trademark.

Mailing lists, in the absence of a satisfactory Chinese press, offer a good medium of reaching the consumer. China has one of the best postal systems, the Chinese are not overburdened with mail and mailing lists not infrequently give 30 per cent replies. Posters are being used in China to good advantage.

In preparing Chinese consumer copy, it is imperative to have copy prepared in China. American-prepared copy invariably holds the advertiser up to ridicule. Once the copy is prepared in China it is often necessary to have two or three translators translate it into English and check against the other to be assured that the statements convey what was intended.

Waterproof and Oilproof Leather

A TREATMENT for leather making it oil-tight and proof against water and mud effects is said to have been developed by the Woodworth Mfg. Corp. for use with spring covers which they manufacture. Leather treated by the process is claimed to be adapted not only for use in this way, but also for any parts requiring similar protection, such as drag link boots and covers for universal joints. Practical tests made by a number of automobile manufacturers are stated to show that leather subjected to the process does not become brittle after long exposure under varying conditions of weather.

Urges Hub Standardization

Editor AUTOMOTIVE INDUSTRIES:

REFERRING to your article entitled "The Need for Standardization of Hub Designs," I am fully in accord with your idea as to the advantages which would result from fair-minded standardization of automotive hubs. It has been my own idea that effective work could be done, if hubs for wood wheels were standardized, as regards hub barrel diameter, thickness of spokes, bolt circle and size and number of hub bolts.

My experience in standardization work in the past three years has taught me that much can be accomplished if fair consideration is given to all who are affected, and they are led to understand the advantages which will ultimately accrue to them. It is only necessary to talk to wood wheel makers to appreciate the expense and inconvenience which this lack of standardization causes. I do not believe that it would be possible to standardize hubs to the extent you have suggested, which contemplates entire interchangeability of hubs on several makes of axles of the same capacity.

I also anticipate very serious trouble in any attempt to standardize hubs for different makes and types of demountable wheels, and in fact I do not consider this to be possible at this time. However, I believe that some good might result if various demountable wheel makers were brought together with the aim of simplifying, if not fully standardizing, their diverse requirements.

W. C. KEYS, Development Engineer,
The Standard Parts Co.,
Cleveland, O.

Characteristics of the Knock

Editor AUTOMOTIVE INDUSTRIES:

IN the Feb. 26 issue of AUTOMOTIVE INDUSTRIES, you described the Midgley indicator, and you show a pressure-time card from an engine using kerosene as fuel, with its typical knock.

You state that the knock is evidenced by a sudden rise in pressure, which is followed instantly by almost as rapid a drop in pressure. Many authorities give the same definition, but I believe that this matter should be looked into more closely, especially as at meetings of the Society of Automotive Engineers this definition passes unchallenged.

A rise in pressure can occur only from two causes, either by the production of large quantities of gases, as in the combination of explosives, or by the evolution of heat. In either case the pressure would be maintained for a considerable period, as the gases would remain gases in one case, and in the other case the specific heat of the mixture would not change to such an extent that it could lose its heat with the rapidity shown by the so-called pressure drop. The terminal pressure, or pressure at the opening of the exhaust, is substantially the same as when no knock occurs. The mere fact that a violent noise is heard does not prove that such pressures exist, because if the speed of flame propagation is high enough, a molecular disturbance will be set up equal or superior to the velocity of sound, which would give just such an effect.

Would it not be better to assume that certain portions of the fuel in the mixture find themselves in a condition similar to the spheroidal state of water in boiling, and go off with a little local "bang," sufficient to start this molecular wave, derange the indicator card, and yet not of sufficient volume to raise the pressure of the entire mass?

R. MILLER,
Secretary and Engineer Reliance Motor Boat Co.,
New York City.

Horsepower Rating

Editor AUTOMOTIVE INDUSTRIES:

THE writer is a subscriber of AUTOMOTIVE INDUSTRIES and has read with great interest the article published recently on the Plix lighting plant.

If you will go through this article, you will notice that the rating of this plant is stated to be 3.6 hp. at 1250 r.p.m. This is not correct.

You will find herewith copy of a letter the writer received from the Plix Lighting Co. regarding this matter. You will notice that in their specification sheet the plant is rated at 3 hp. and the speed is 1250.

The hp. 3.6 which you arrive at corresponds to a piston speed of 1000 ft. per min. The piston speed being only 625 ft. per min. in the case of the Plix plant, the proper rating for this speed would be 2¼ hp.

However, such a rating would be too small, as 3 hp. can easily be gotten from a plant of this size.

As an engineer, I wish to suggest that this be corrected in order to make the data valuable.

CHARLES FROESCH,
Chief Engineer,
The S. W. Merritt Co.,
New York City.

(The pamphlet of the manufacturers reads: "S. A. E. or R. A. C. Rating 3.6 HP. Normal Speed 1250 R.P.M."

As the S. A. E. rating implies a speed in this case of 2000 r.p.m and the engine is intended to run only at 1250 r.p.m., the use of the S. A. E. rating for this engine is rather misleading.—Editor.)

The 183 Cu. In. Engine

Editor AUTOMOTIVE INDUSTRIES:

THE authors of the article entitled "The Design and Construction of the 183 Cu. In. Engine," appearing in the March 26 issue, appear to be under the impression that high piston speed rather than high r.p.m. should be aimed at in obtaining maximum power, and that it is possible to increase the power of an engine of given displacement by limiting the rotative speed and increasing the piston speed by altering the stroke-bore ratio. This is incorrect.

Assuming the same general design in all cases, the power developed by a cylinder will be essentially pro-

portional to the number of cylinders full of gas taken in and exploded in a unit of time. If we limit the number of r.p.m., we limit the amount of gas taken in and burned in a unit of time, no matter how high the piston speed is carried by decreasing the bore and increasing the stroke. At, say, 3000 r.p.m., the amount of gas taken in and burned in a 90 x 118 mm. engine will be exactly the same as in a 78 x 156 mm. engine in spite of the fact that the piston speed of the latter will be considerably higher.

It is possible, on the other hand, to limit the piston speed to a given figure and still increase the power by decreasing the stroke and increasing the r.p.m., so long as constructional difficulties do not ensue.

By increasing the stroke and decreasing the bore a very slightly more compact combustion chamber is obtained, but the weight of the engine is increased and the pistons and cylinders will wear out faster. Airplane engineers are already commencing to realize this fact, but it appears to be taking most automobile engineers a long time to awaken to it.

Confusion regarding the subject of the stroke bore ratio appears to have arisen from the fact that, if the bore of an engine is held stationary and the stroke increased, greater power is obtained. This is merely because the displacement is increased and a larger engine is the result. The same would be true if the stroke were held stationary and the bore increased. This has nothing to do with the question of what is the most desirable stroke-bore ratio. When the racing car rating rule was based on the bore alone, it was natural for makers to resort to increasing the stroke in order to obtain a larger and more powerful engine. This did not promote good design, it encouraged abnormal design.

EDWARD G. INGRAM,
Grand View-on-Hudson,
New York.

Crankcase Dilution — Connecting the Breather to the Inlet

Editor AUTOMOTIVE INDUSTRIES:

REFERRING to the editorial on "A Suggested Remedy for Crankcase Dilution" in the Oct. 23 issue of AUTOMOTIVE INDUSTRIES, and to W. B. Jones's reply to this in the Dec. 25 issue—the method proposed, that of drawing all of the air for the carbureter through the crankcase—does not appear to me to be workable. Let us consider the matter more fully.

In the editorial it is pointed out that it is the heavier fractions of fuel which find their way past the pistons, and which have a boiling point of probably over 300 deg. F. The method proposed for removing these from the oil is apparently the slow process of surface evaporation. In connection with this it should be kept in mind that a liquid will evaporate much faster if the air is constantly blowing across it, than it will in still air; and a liquid in an enclosed space will evaporate only to a certain point. In order to remove as much of the fuel as possible from the oil in a given time, it would be necessary to draw the air completely across the surface of the oil at as rapid a rate as possible. It is probable that even then most of the fuel would remain in the oil, for, in the winter, when dilution is worst, the oil is maintained at a fairly low temperature.

Mr. Jones points out in his reply that the oil mist existing in the crankcase would be drawn along with the air, increasing the oil consumption and fouling the cylinders and spark plugs. This would certainly be the case if the air were drawn directly across the surface of the oil in the pan, as stated above. Even if the oil pan were separated from the crankcase proper by a sheet metal plate with small drain holes, so that there would be two separate compartments, and the air drawn between the plate and the oil surface, there would still be a large amount of oil entrained in the air; for the action of the car on uneven pavements and rough roads causes the oil to be continually surging and splashing, so that a mist similar to that in the crankcase is formed.

Mr. Jones suggests the use of centrifugal separators to remove the oil from the air. He does not state what he intends to do with the oil that is removed. As it will contain considerable fuel, it will probably be thrown away. It is much simpler to drain the oil from the pan occasionally, and throw it away, as we are doing now.

Mr. Jones also suggests withdrawing the air from the less turbulent regions of the upper part of the crankcase, to minimize the oil loss. As pointed out in the second paragraph of this letter, the air must be drawn over the surface of the oil in order to be at all effective in removing the fuel. Drawing the air from a point distant from the oil will not aid in taking out the fuel.

The breather can very readily be eliminated from the engine by using in its place a small pipe or flexible tube connecting the crankcase with the carbureter air inlet. This pipe serves merely to equalize the pressure difference between the crankcase and the outside air. This has been used on the majority of high-grade marine engines for a number of years, its object on these engines being to eliminate the smoke from the open breather, which is objectionable in a closed cabin or engine room. This system can be very readily fitted to an automobile or truck engine, and will keep the dirt out of the crankcase. The crankcase end of the pipe should enter where there is not much oil thrown, so that oil will not be drawn through it. A fine wire screen should be fitted at one end of the pipe to prevent a possible crankcase explosion when the engine back-fires.

I fully agree with Mr. Jones that passenger cars, as well as trucks and tractors, should be fitted with air-cleaners. Most of the wear on pistons, rings and cylinders is caused by grit entering the cylinders with the air, and the carbon which forms in the cylinders contains a considerable amount of grit. An efficient air cleaner, preferably of the dry type, would materially increase the life of an engine.

LEONARD OCHTMAN, JR.,
Akron, Ohio.

Reducing the Number of Hub Designs

Editor AUTOMOTIVE INDUSTRIES:

WE do not know if there is any possibility of starting a movement towards standardizing the axles for automobiles so there would be a limited number of bearing and hub designs.

You are entirely right relative to the multiplicity of hub designs proving a source of serious expense to the users of automobiles when they desire to have either wire wheels or disk wheels furnished for their cars.

We believe that such a movement toward standardization would be a very good thing; we do not feel that we are in a position to start such a movement, but believe we would be able to help after the movement had been started. We certainly think that with the co-operation of the axle makers, a certain number of standard designs could be adopted, thereby greatly reducing the number of designs in use.

H. E. DERBYSHIRE, General Mgr.,
Budd Wheel Corp.,
Philadelphia.

Shop Committee Development Possible in Unionized Plant

Some manufacturers have indicated a desire to establish industrial representation but thought it impossible because their shops were completely unionized. The successful development of a shop committee in an English plant shows the possibilities of organization in co-operation with unions.

By Harry Tipper

THE following story which was printed in the Times Trade Supplement of London was referred to us by our correspondent in Great Britain. It is of sufficient interest to warrant its republication here for several reasons. We have pointed out a number of times the complete unionization of the industries in Great Britain and also the way in which the unions through their voluminous rules and regulations are able to control the operations of industry. From time to time these articles have indicated the jealousy which existed between different craft unions, the strength of union precedence and the difficulty in establishing any other machinery for adjustment.

One of the objections to the shop committee development in this country has been the difficulties with the craft unions which it might involve, and the shop steward system of Great Britain has been referred to in indicating these difficulties. This story shows how one organization successfully developed a shop representation system in a completely unionized factory in spite of the jealousy of the craft unions, and the rules and regulations which have grown up to such an extent in that country.

It is interesting, because of the detail which the story goes into and because of the effect upon production in a country where the unions have frankly limited production and agitated for a small number of hours with a restricted output, and finally it is interesting because it deals with a truck factory in that country. The factory referred to is the Vulcan Works at Crossens, near Southport, Lancashire, England. Many of the features of this experiment are well known and generally adopted on this side. They are included only because they are necessary to the complete story and its conclusions.

This Lancashire factory is identified with the manufacture of a 30-cwt. motor lorry along mass production lines. In pre-war days the highest weekly figure of output ever attained was ten vehicles and that was during a week of 57 hours—one vehicle for every 5.7 working hours. Under the new arrangement the output is 100 vehicles per week of 45 hours with a payroll of 1800 men, representing one vehicle every 45 working hours.

While the designed output of the factory is 100 vehicles per week, this figure, owing to the change over from war work not yet being complete and the whole of the requisite machinery not yet having been installed, has not been established permanently, although it was actually exceeded in a recent week, when 102 lorries were turned out during the 45 hours. Nevertheless, the graph of production is steadily rising, the figure having already been carried beyond 70 per week, while certain sections of the establishment, where equipment is complete and organization perfected, such as the foundry and wheel shop, are steadily maintaining the prescribed figure.

Upon the completion of the mechanical installation, neither the management nor the laboring army has any doubt but that the designed output will be attained and steadily maintained, the workmen being every whit as keen as the management to secure and hold the 100 per cent capacity figure.

The most conspicuous feature of the establishment is the organization of labor. The institution of the scheme proved to be no easy matter owing to the diversity of the trades concerned and the multiplicity of the unions involved, which, as is well known, have no common policy governing principles of working. In this instance the issue was aggravated by the circumstance that the factory is as self-contained as modern motor-manufacturing methods will permit, the various details made upon the spot including body work, upholstery, foundry for all non-ferrous metals, radiators, wheels, and other components.

Conflict between the various trade union interests involved was expected and encountered, and in specific instances the unions concerned manifested no desire to delegate their powers and control over labor to the local representatives.

The forces of labor are represented by a committee of 40 shop stewards and foremen elected by the men, each delegate representing a certain phase of production. This constitutes the full "council," which discusses all important questions, but, being considered too unwieldy for general purposes, it has elected an executive committee numbering seven, including the secretary and chairman.

This is the active committee, and it is invested with comprehensive powers; it is the link between the management and labor. But even this committee was found to be somewhat too cumbersome to handle with the requisite expedition all the issues which arose. Accordingly a daring innovation was introduced at the suggestion of the management. This was the appointment of one of the shop stewards upon a full-time basis to attend to all the requirements of the working army, and the administration suggested that he should constitute the primary intermediary between the management and labor. This was a proposal certainly new to British industry, and aroused additional interest when the man-

agement undertook to relieve the men of the financial burden incidental to his appointment.

When the proposal was first mooted the workers demurred against the salary of the whole-time shop steward being defrayed by the company. It was argued that the shop steward, being a servant of the company, would tend to lean toward the management's side in the settlement of disputes. But saner counsels prevailed, and it was decided to submit the scheme to a six months' trial.

The representative occupying the position of whole-time shop steward is known throughout northern labor circles, having occupied various offices in his union during the past 20 years. His selection was made essentially because of his wide experience. He acts in the capacity of intermediary between labor and the management, and all grievances are first placed in his hands for adjustment. He is accessible to every workman, either direct or through the latter's shop steward. If he considers the matter in dispute of sufficient importance to be submitted to the administration he does so in accordance with the routine that has been elaborated, although the management has conceded the request that it shall be approachable at any and every time to insure prompt decisions.

The scheme has proved successful so far as it has been conducted. When a dispute arises the whole-time representative personally investigates the case. There is a consultation between the aggrieved workman, his foreman and the shop steward of the section concerned. If the man's complaint is well founded the difficulty is adjusted forthwith, and in an amicable manner. On the other hand, if the complaint is frivolous there is no hesitation in giving the decision against him. Difference of opinion results in the reference of the matter to the executive committee, who decide what action shall be taken.

It will be seen that the scheme insures the centralization of the consideration of complaints and disputes in a representative who, in the first instance, alone has the power to consult the management if necessary; the elimination of all trivial and imaginary complaints; the reduction to a minimum of interruptions of the management in the pursuance of their work. Formerly they were subject to interviews with this and that workman at all times. Equitable decisions under such conditions were impossible, while confusion and discontent were rife. But now the management has the satisfaction of knowing that only legitimate complaints can be brought to official notice.

The scheme has been found to be conducive to smoother and more harmonious working. Less time is wasted, while the general atmosphere is one of greater contentment.

It has also brought the management and the men into closer and more friendly contact, has led to the introduction of many reforms and concessions which are appreciated, such as the distribution of tea among the day workers in the morning, meat extract to the night workers, and the granting of specified periods for smoking. Such contact also leads to the more harmonious discussion of questions affecting the welfare of both the management and the workers, which cannot fail to exercise its influence upon output. For instance, the dearth of housing accommodation for the workers in close proximity to the factory has led to the formation of a Housing Committee, upon which representatives of the management and the workers are represented. United pressure can be brought in this way to bear upon the various authorities vested with the powers to provide living accommodation for the toilers.

When the agitation for a reduction of hours was finally settled by the acceptance of the 47-hour week it was immediately followed by a milder request for a week of 44 hours. Upon this point a compromise was reached, 45 hours being accepted by both sides. Then the men demurred against being brought to the factory on Saturday morning for two or three hours' work. Through the shop steward it was suggested that Saturday should be a complete holiday. He offered, if the management would concede the men the whole of Saturday, a nine-hour day for five days. This was ultimately accepted, and has proved highly successful. In fact, the men are now doing more during the 45 hours five-day week than they did during the 47 hours five and one-half-day week, output having gone up by quite 60 per cent. The working day is now 8 a.m. to 6 p.m., with one hour break in the middle of the day.

The payment by results system is fixed at one and one-half times on the basic rate, and prices are never cut unless the method of production is altered. Consequently when an improved method of fabricating a part or fulfilling a desired operation is elaborated, a discussion takes place and a revision is introduced so long as it does not adversely affect the financial interests of the workman. Every encouragement to produce more is given and methods are constantly undergoing improvement, since naturally the management is primarily concerned in reducing the manufacturing charges. Price revision in these circumstances, and at relatively frequent intervals, is inevitable, but the men have proved to be amenable to reason and readjustments in this connection, inasmuch as their interests are fully safeguarded by their whole-time representative. The result is that whereas the most highly skilled workmen are able to earn from £7 to £8 per week, no man earns less than £3 1s. 8d. per week of 45 hours.

The labor is divided into three broad classes—skilled, semi-skilled, and unskilled, respectively—and the scope of each has been closely defined to guard against the growth of any dissatisfaction under this heading. In addition, every worker receives a bonus for each chassis turned out. This has been fixed at threepence per chassis for the skilled labor and twopence per chassis for the semi-skilled and unskilled labor, respectively. Under the chassis bonus scheme, upon an output of 100 lorries a week the skilled hand has his wages supplemented by 25 shillings, while the increment to the non-skilled and semi-skilled is 16s. 8d. per week.

Perhaps in no other industrial state are the unions so strongly organized or so thoroughly in control of industrial operations as they are in Great Britain, and particularly in the northern part of the country.

Lancashire and Yorkshire were the homes of the original co-operative movement. It was in these counties that trade unionism gained its first strength. It was in these counties that the new guild movement is being tried out on a large scale.

One or two manufacturers have indicated to me their desire to establish representation schemes in their own places of business, but they have felt such attempts were impossible in establishments already strongly unionized. This experiment should indicate the possibility of successfully carrying out a project, even where the unions are in charge.

It is interesting to find this complete detailed account in a daily newspaper, a point which illustrates the difference in the public attitude toward the details of labor and capital problems.

AUTOMOTIVE INDUSTRIES
The AUTOMOBILE

PUBLISHED WEEKLY
Copyright 1920 by The Class Journal Co.

Vol. XLII Thursday, May 27, 1920. No. 22

THE CLASS JOURNAL COMPANY
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SUBSCRIPTION RATES
United States and Mexico - One Year, $3.00
Extra postage west of the Mississippi River on account of Zone Postage Law, 0.50
Canada - One Year, 5.00
Foreign Countries - One Year, 6.00

To Subscribers—Do not send money by ordinary mail. Remit by Draft, Post-Office or Express Money Order or Register your letter.

Owned by United Publishers Corporation, Address 239 West 39th St., New York; H. M. Swetland, President; Charles G. Phillips, Vice-President; W. H. Taylor, Treasurer; A. C. Pearson, Secretary.

Entered as second-class matter Jan. 2, 1903, at the post-office at New York, New York, under the Act of March 3, 1879.

Member of Associated Business Papers, Inc.

Member of the Audit Bureau of Circulations.

Automotive Industries—The Automobile is a consolidation of The Automobile (monthly) and the Motor Review (weekly), May, 1902, Dealer and Repairman (monthly), October, 1903, and the Automobile Magazine (monthly), July, 1907, and The Horseless Age (semi-monthly) May, 1918.

Highway Traffic Managers

THERE should be a traffic manager for each highway system, whether that system be a state, county or municipal system, is the assertion of George Diehl of Buffalo, one of the leaders in the fight for better highway transportation.

This traffic manager, according to Diehl, should be empowered to route traffic as to its needs and for the benefit of the community and the highways. As an example, he said that he had witnessed recently a congestion in the heart of a rather large city, caused by the passing through of 100 or more cars being driven from a factory. These cars, Diehl said, should have been routed through the outskirts of the city. In this case there would have been less danger of damage, greater speed and a wonderful conservation of temper and profanity. Another example came in the undertaking of repair work on highways only after routes have been arranged for the traffic, either through detours or to other highways or specially built detours.

In this connection it might be recalled that only a few days ago more than 100 trucks carrying fabric to tire factories were compelled to pay $20 each to a road foreman for the use of the detour he had constructed while working on the roads. Of course, this action was entirely illegal, but the state traffic man would be a policeman for just such acts. The traffic manager could easily make accurate and definite statements as to routings for tourists and commercial hauling.

This suggestion appears to be a practical one and a big move in the direction of aiding highway transportation. It is to obtain such men as are needed for this work that the recent Educational Conference at Washington recommended a great increase in the facilities for highway and motor transport education.

The educators at that meeting let it be known that, to increase their educational facilities to cover this field, amounts of money greater than are now available would be needed. They said that they expected to obtain this money from legislatures and private sources but that it certainly was up to the automotive and highways industries to support their campaigns and to aid them with gifts of cash when possible. Roy Chapin, of the Hudson Motor Car Co., has financed two fellowships in highway study for this year at the University of Michigan and there is an opportunity for more work of this kind.

But, above all, do not forget to pledge your legislative candidates to a reasonable attitude on appropriations for the coming automotive educational needs.

Ten Years' Good Work

A NOTABLE committee has been named to arrange the decennial celebration for the Forest Products Laboratory at Madison, Wis., on July 22 and 23. The names of this committee, as is natural, include many men prominent in the lumber industry and the lumber press. But there is an even greater number of names familiar to the automotive industry. They are men who devoted their time and talents to the development of aircraft during the war and thus came into contact with the laboratory.

The ten-year career of this laboratory has been an especially commendable one. Its attention has been devoted to entirely practical problems and it has contributed much to the authoritative literature on woods. Some of the subjects that have been studied are Pulp and Paper, Decay and Decay Prevention, Mechanical Properties of Wood, Grading of Woods, Boxing, Crating and Packing and Steam Bending.

The Forest Products Laboratories is to be congratulated on its past and its prospects for the future.

THE motor truck is performing valiant service these days as an efficient medium of transportation. But those who know the capabilities of the American-made truck are not surprised at the wide extent to which manufacturers are turning to it as the solution of their transport problems. It is only revealing again its true place in the transportation trinity of trains, steamships and trucks.

To the Memory of

C. H. Gurnett

Who contributed for 17 years to the growth of the Class Journal publications, the automotive industry and the advertising profession.

SWIFTLY the world moves and soon are they forgotten who serve valiantly in their day—and then pass on.

Too soon from daily thought pass the deeds done by able men, too quickly does the mist become impenetrable over the faces of those who help to make our world a better place for all of us.

To the memory of C. H. Gurnett we wish to pay our tribute—the little we now can do for one whose character and work rendered him dear to thousands, who share with us the sorrow of his passing.

ONE aim in life—to do well that thing which he did, whatsoever it might be—greater than which cannot be said of any man.

Integrity was personified in him in full degree. Thoroughness at all times characterized his daily life and work.

Believing in himself and his work, he possessed himself of the fullest measure of knowledge of his craft, and to essential detail gave that attention which eliminates the detail and leaves the observer with a conception of only a pleasing and fully consummated masterpiece of clean result.

NO business man who dealt with him but remembers well all these things. In the hurry of the modern world, when temptation often leads to short but doubtful paths of haste, he built soundly and solidly, traveled rapidly but surely, and left in every place a friend.

A multitude will miss him as it misses always the player who plays the game by the rigid rules of real men.

The words we can use are so inadequate—but the twinging heart-strings will long reverberate in memory.

Trucks Get Supplies to Factories

Automobile Plants Keep Wheels Going

Manufacturers Settle Down with Firm Determination to Overcome Obstacles

NEW YORK, May 24—Dispatches to AUTOMOTIVE INDUSTRIES from its correspondents in the automobile centers of the country, disclose that manufacturers are making herculean efforts to keep their plants in operation in spite of the collapse of the railroads. Conditions are much better than might have been expected in view of the obstacles which must be faced.

All plants are in operation. In cases where production has been cut because of the shortage of supplies, not more than 10 per cent of the employees have been laid off. This is true especially in the Detroit district. From some other cities come reports that factories are operating, fully manned.

These gratifying conditions are due almost wholly to the intensive use of motor trucks. They have been the salvation of the industry at a time when the railroads could be depended upon for nothing. They are making regular trips over long distances and are standing up splendidly under the heavy strain imposed upon them. They have demonstrated that the time will come when the automotive industry can be independent of the railroads for short haul business and that it can stand upon its own feet entirely in an emergency.

Executives of automobile factories are displaying a dogged determination to keep going in spite of everything. They positively refuse to be discouraged and are maintaining splendidly the morale of their organizations. They are disregarding the extra manufacturing costs and the motto over their desks is "business as usual." They never have fallen down in an emergency and they are skilled in meeting problems. They are not tied up in the red tape of tradition. They are resourceful and determined.

These manufacturers are determined not to quit. They have settled down to a grim determination to prove to the country that automobiles are not luxuries or even non-essentials but that they are transportation and that without them the wheels of industry would be halted most effectively by the collapse of rail transportation. To do this they are curing their own ills by the use of motor trucks.

RAUCH & LANG BUYS SITE

SPRINGFIELD, MASS., May 22—The factory of the Rauch & Lang Co., manufacturers of electric automobiles, will be located at Willimansett, between this city and Holyoke, instead of within bounds of the latter city. The company has bought 14 acres of land in that town at McKinstrie Avenue and Meadow Road. Decision was governed, it is stated, by the better railroad siding facilities and lower prices of realty. The financial consideration involved is not stated.

Little Hope for Aid From Use of Canal

NEW YORK, May 24—Brig.-General Hines, chief of transportation of the army, declared in testimony before a House committee at Washington, Saturday, the immediate relinquishment of the Erie canal by the War Department would be unwise.

"Now is the opportunity," he said, "to make a real test of the waterways. The railroads, for the first time, are willing to co-operate."

Gen. Hines added that plans had been made for moving wheat from Buffalo to the seaboard and for handling freight stalled along the line of the canal where railroads are operating at only 50 per cent efficiency.

Almost simultaneously, the Merchants Association of New York issued an appeal to its members for more general use of the canal in connection with the lake lines. It explained that the Great Lakes Transit Corp. operated from Buffalo in connection with the canal lines. The two canal lines operating between New York and Buffalo are the Inland Marine Corp., with 80 boats, and the Government line, known as the New York Canal Section, with 90 boats.

Investigation discloses, however, that manufacturers in the automotive industry can hope for little relief by use of the canal. The Canal Section, the War Department line, is using the major part of its tonnage in handling grain and flour with some copper and pig iron. All its space is contracted for up to July 1. The same is true of the Inland Marine Corp. The War Department expects to handle 1,500,000 tons of grain a month in its boats.

TO STUDY EUROPEAN PLANS

WASHINGTON, D. C., May 20—Commander J. C. Hunsaker, of the United States Navy, has left Washington for Europe. Commander Hunsaker, who is in charge of the Aircraft Division of the Bureau of Construction and Repair, Navy Department, will visit England, Germany and France to collect information on aircraft activities in those countries.

The Commander will, while in England, deliver the Wilbur Wright Memorial lecture at Central Hall, Westminster, London, on Tuesday, June 22, the title of his paper being "Application of Naval Architecture to Aeronautics."

Detroit Establishes Efficiency of Trucks

Use of Fleets Keeps Factories Operating—Parts Hauled Long Distances

DETROIT, May 22—The acute freight situation has given opportunity for manufacturers to study thoroughly the efficacy of motor trucks in solving the transportation problem, as the aid the trucks have furnished has kept practically every factory in Detroit in operation.

While one or two factories, notably Ford, have for almost a month been depending entirely on freight cars to bring in materials of all kinds, the others have used trucks and have driven from points as far away as Indianapolis, Syracuse, Chicago and Milwaukee. Traffic officials admit readily that the truck has solved the problem thus far, but how long the overland plan can be operated is a question.

The matter of roadways and the wear and tear caused by the heavy trucks is one of the big problems. The wear on the trucks also must figure in the cost accounting. As one manufacturer expressed it, two or three trips over the shattered roadways around Detroit practically end a truck's usefulness and it becomes necessary to tear it down and virtually rebuild it. The expense of such operation is enormous, and factory executives admit that such operation means actual loss to them. They declare the only reason for continuing it is a conscientious effort to maintain production in the hope of complying to some extent with the demand for automobiles.

Equipment Supplies Low

Virtually all the plants in this vicinity, while they are in good shape in so far as steel and the larger parts are concerned, are operating on a hand-to-mouth basis as regards castings, bearings, steering apparatus, leather and all smaller parts. These are being handled in trucks, and in some instances, volunteer switching crews are being used to bring freight cars into the city.

Dodge Brothers are operating only by adopting the most extraordinary methods of bringing in materials. The company has its own switching crews in Chicago, Pittsburgh and other gateways, including the coal mines in Kentucky and West Virginia. With these crews and by loading up entire trains that are sent straight through to Detroit, where they are taken in charge by Dodge crews and shifted into the factory yard, the company has been able to keep itself supplied with parts and materials.

Scripps-Booth Corp. has a fleet of 10

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Steel Goes from Mills in Trucks

Pittsburgh District Reached by Fleets

Autocar Co. Resourceful—Bethlehem Motors Independent of Railroads

PHILADELPHIA, May 24—Manufacturers of motor cars and motor car parts in Philadelphia and vicinity are using motor trucks extensively to haul raw materials to the factories. This condition has prevailed for some time.

The Autocar Company, Ardmore, is using from six to fifteen trucks to haul sheet steel, steel bars and wheel parts from Pittsburgh, Youngstown and Cleveland, relaying parts from Chicago to Pittsburgh to Ardmore in some cases. The company here supplies Eastern branches with parts, so uses a return load system where possible.

Bethlehem Motors Corporation, Allentown, is the most extensive hauler under new conditions. It is using fifteen trucks continuously hauling motors from Pottstown, springs from Wilkes-Barre, cold rolled and sheet steel from Bethlehem and small articles used in assembly from Philadelphia. The corporation maintains also ten trucks of three-and-a-half tons at Buffalo, to haul radiators, frames and the like. It has been unable for two months to get freight or express shipments from Buffalo to Allentown. A factory representative here to-day said he foresaw worse conditions when the heavy shipping season arrives.

The Vim Company is hauling generators from Newark by truck.

The Traylor Engineering Co., manufacturer of Traylor trucks and tractors, Cornwells, Pa., is hauling once or twice a week by truck as follows: Cold rolled steel from Baltimore, transmission from Buffalo and Lockport, steel bumpers and fenders from Binghamton and small units from New York.

REPUBLIC SEPARATES DIVISIONS

ALMA, MICH., May 25—Republic Truck Co., Inc., has separated the production organization from the sales and service departments, and a subsidiary corporation has been formed under the name of the Republic Truck Sales Corp. to take over the sales and service departments. The personnel is the same in the new corporation as under the old régime.

INTERSTATE TO MAKE FRAMES

MILWAUKEE, May 24—The establishment of a new industry which will specialize in the production of fabricated steel frames for motor trucks and tractors is being undertaken by the Interstate Steel Mfg. Co., which is a reorganization of the Bayley Structural Iron Co., 705 South Pierce Street. Contracts have been awarded for the first unit of a new plant at Forty-seventh Avenue and Rogers Street, in West Allis, on a 3-acre site. The first building will be 80 x 250 ft., and will be ready about June 15. The Bayley company was established 10 years ago with a capitalization of $60,000, which has been increased to $150,000 under the reorganization. The present officers are: President and general manager, Harry F. Bayley; vice-president, George Hoehn; secretary and treasurer, W. R. Geiger.

Electric Lines Could Handle More Freight

NEW YORK, May 24—It was said to-day at the headquarters here of the American Electric Railway Association that the electric lines which operate freight and express service are doing a very large business, but that most of them undoubtedly could handle more. Some of the Western roads are operating freight trains at night.

During the war carload shipments were made between widely separated points over several connecting roads but no steps in this direction have been taken in the present emergency by the Interstate Commerce Commission. It would be practical to move freight in this way between New York and Boston, but the section where it could be used to best advantage would be in the Chicago territory and in Ohio and Indiana. It also would be possible to make through shipments between Buffalo and Little Falls in New York, but at Little Falls they would run into the neck of a bottle and there would be no means of getting them in or out except by rail or canal.

GLOBE ELECTRIC EXTENDS PLANT

MILWAUKEE, May 24—The Globe Electric Co., 193-197 Broadway, manufacturing motor-generator sets, farm lighting plants, storage batteries, etc., has outgrown its plant and is breaking ground for a new works on a new 10-acre site at Keefe and Humboldt avenues. The initial construction will involve an investment of $150,000 in new buildings and equipment. J. D. Wanvig is treasurer and general manager.

DU PONT BUYS BODY PLANT

WILMINGTON, DEL., May 26—Du Pont Motors, Inc.. manufacturers of the new du Pont car, with headquarters here, has obtained control of a body building plant in Philadelphia, to insure an ample supply of closed cars. The name of the concern has not been divulged. The du Pont Co. now has its only plant here, but it is constructing a new one at Moores, Pa., on the outskirts of Philadelphia. The touring car and roadster bodies are now being built in Springfield, Mass.

Cleveland Praises Truck Achievement

Without Their Use Factories Would Close—Permit Use of Full Forces

CLEVELAND, OHIO, May 22—"If it had not been for the motor truck during the tie-up of freight our plant would have been closed," said H. T. Hickman, traffic manager of the Peerless Motor Car Co., in speaking to-day of the service the motor truck has been to his plant in recent weeks.

"The motor truck largely is responsible for the fact that every one of our 2000 regular employees has been on the job without loss of time during the strike of railroad switchmen. The truck kept these men at work by bringing in raw material that was needed to keep up production."

The Peerless company operates a fleet of sixteen of its own trucks in a radius of 200 miles. Sand, lumber, body stampings, forgings, etc., are transported in them.

The Standard Parts Company, one of the largest makers of auto parts in the country, has kept its force at work largely through the help of the motor truck in bringing in raw materials.

The Chandler Motor, Grant, and Jordan are among other large concerns giving credit to the truck for bringing in raw material needed to keep the plants going. In many instances raw material is shipped by freight to points within 150 miles of Cleveland, that are not affected by the strike and the products are then relayed from these places to Cleveland.

While traffic between Akron and Cleveland increased 45 per cent in the last two years motor truck transportation went up 171 per cent. It would require 80 freight cars loaded to the roof to transport the amount of freight that is hauled between the two cities in an average day of 24 hours.

250 Trucks in Akron Line

Two hundred and fifty motor trucks every day for 300 days in the year transport freight worth $1,500,000. In a year these 250 motor trucks haul freight valued at $500,000.000 over this stretch of 40 miles between the two cities. Each year these trucks release 24.000 freight cars for the transportation of other materials.

Before motor trucks were used a shipment of freight which left Akron at 6 p. m., Monday morning, was delivered to the consignee in Cleveland some time Wednesday afternoon. Now the goods shipped at the same hour are delivered here at 1 p. m. the same day.

Essentials Are Hauled by Trucks

Franklin Materials Brought 600 Miles

Fleet Sent Out After Supplies—Other Syracuse Plants Use Same Methods

SYRACUSE, May 24—Use of motor trucks to bring in raw material from points as far distant as 600 miles has enabled Syracuse automobile and parts manufacturers to continue capacity production despite the freight congestion on the railroads. When the switchmen's strike broke, the H. H. Franklin Mfg. Co. put its fleet of Packard trucks on the road and made regular runs to Syracuse from New York, Buffalo, Troy and Oriskany, keeping a steady stream of body parts, forgings, steel stampings, steel, ball bearings, etc., coming into the factory. One feature of the trips was the ability of the trucks to call at different points to pick up various shipments. In Buffalo five stops were made and the truck drove direct to the shipping room doors of each plant.

The New Process Gear Company has been able to keep its plant running by using trucks as an auxiliary service, bringing raw material from Buffalo, two or three trips a week. This company, however, has been able to use the trolley express which makes daily runs to Syracuse from Buffalo and has used trucks only for overflow shipments.

The Brown-Lipe-Chapin Company and the Brown-Lipe Gear Company have been in much the same situation. The former found motor trucks the one available means of obtaining material in the emergency when the strike tied up the Syracuse freight yards and several cars of much-needed steel were stalled at points within ten to fifty miles of Syracuse. Once the cars were located, it was a simple matter to send out a fleet of trucks, unload the cars where they were stalled and bring in the material to Syracuse. This company was the first in this city to use the trolley express to Buffalo extensively. The situation here has been greatly improved by the opening of lake transportation.

Alabama to Spend $50,000,000 on Roads

MOBILE, ALA., May 24—Alabama is pointing the way for the South to get out of the mud. During the next twelve years, Alabama will spend $50,000,000—half of it State money and the other half Federal funds—to construct a system of roads connecting each county seat with every other county seat, linking all with Mobile, Alabama's only port, and connecting the entire system with the transcontinental highways reaching the other states of the South. A State bond issue, already voted, accounts for the $25,000,000, and its distribution is so circumscribed that every cent will go for roads.

No general tax will be levied to pay any part of the bond issue, either principal or interest. The entire cost will be met by a 50 per cent increase in the automobile license tax.

The bonds are to be issued at the rate of two million a year for 11 years, with a culminating issue of three million in the twelfth year. The money all goes into a State highway fund, to be used exclusively for the construction and maintenance of a system of State trunk roads. By bonding herself as a State, Alabama is enabled to avail herself of Federal aid.

Ace Uses Big Fleet to Get in Supplies

NEWARK, O., May 24—Operating its own fleet of motor trucks between parts makers and factory, the American Motor Truck Co., manufacturers of Ace trucks, is maintaining production despite the serious transportation tie-up.

When it became evident that the company would be unable to secure material by rail, it immediately assembled a fleet of 15 Aces, which are driven to the following cities: Racine, Wis., Harvey and Rockford, Ill., Sandusky, Cleveland and Toledo, Ohio, and Philadelphia. Truck loads of Buda motors, Modine-Spirex radiators, Cotta transmissions, Parish and Bingham frames, Spicer universal joints, Mather springs, Dayton steel wheels, Cotta clutches and control sets, and Ross steering gears were hauled overland to the Ace factory for assembling.

A total of 4,920 miles was covered on the first trip which required eight days of western and five days of eastern travel. No trouble of any kind was experienced.

TRUCKS SHIPPED BY BOAT

DETROIT, May 24—A consignment of 40 G.M.C. trucks left Detroit by boat last Sunday for Minneapolis. The cargo will be unloaded at Duluth and taken to its destination by rail. This is the first boat shipment of trucks from Detroit, though the river route has been used to a great extent in shipping passenger cars during the freight tie-up.

RAIL RATES ON PLANES CUT

WASHINGTON, May 24—Reduced rates on airplanes, flying boats or hydroplanes, loose, and in carloads, have been authorized by the Interstate Commerce Commission on application of carriers for which R. C. Fyfe, J. E. Crossland and R. M. Collyer, respectively, are agents. The reduced rate schedule must become effective before Aug. 1.

Milwaukee Is Able To Run Full Blast

Trucks Have Saved Day Against Rail Barriers—Electric Lines Also Help

MILWAUKEE, WIS., May 22—Motor trucks are saving situation by making it possible for Milwaukee manufacturers of engines and automotive parts to keep supplied with raw and semi-finished materials despite the great barrier raised by the acute congestion of Chicago railroad terminals. Practically no men have been laid off here on account of the shortage of materials.

Engine builders keep trucks going day and night bringing castings and forgings from within a radius of one hundred miles. Heavy material, such as frame stock, originating in the Pittsburgh district, is coming through with fair dispatch by rail. Milwaukee's advantageous location on the lakes makes possible shipments by water from the East, either direct from lower lake ports or by rail to the east shore and thence across the lake by car ferry.

The Chicago, North Shore & Milwaukee electric line recently instituted service from the Chicago district by freight trains running all night, motor trucks doing feeding and distribution. This supplants express service for small parts in less than carload lots.

Wisconsin aluminum founders are shipping crankcases by truck to lake ports for water shipment to Detroit, Cleveland and Buffalo. The bulk of other parts is delivered by truck, lake and rail in sequence.

HOLD OFFICIALS FOR FRAUD

MUSKOGEE, OKLA., May 22—C. F. Harris and J. D. Clifton, officers of the American Tire & Rubber Co., have been arrested here by Federal officers on charges of using the mails to defraud in a stock selling scheme. It is alleged stock was sold all over Oklahoma on the assertion that the company had a factory in operation. One of the inducements offered was a material reduction on tires to stockholders.

IMPOSE DYER LAW SENTENCE

ST. LOUIS, MO., May 22—Roy McBride of Louisville, Ky., to-day in the Federal Court here, was sentenced to serve a year and a day in the Federal Prison of Leavenworth, Kan., on a charge of transporting a stolen automobile from Louisville to St. Louis. This is said to be the first conviction under the recently passed Dyer act, which makes it a Federal offense to bring a stolen automobile across a State line.

Studebaker Advises Dealers on Credits

Should Demand Legitimate Share from Banks, but Avoid Abuses, Says Company

SOUTH BEND, IND., May 24—The Studebaker Corp. has sent the following letter on the financial situation to all its dealers:

"We understand that some banks of the country are refusing to grant banking accommodations to automobile dealers, on the ground that the automobile is a pleasure vehicle and non-essential.

"So far as Studebaker dealers are concerned, we believe they are able to take care of themselves, but if any of them are doing business with banks which deny them reasonable credit accommodations, we advise such dealers to move their accounts to other banks conducted on a broad-minded policy.

"The Studebaker Corporation does business with a number of the largest and most important banks in the United States, and we are therefore in a position to state, for the information of our dealers, that these banks consider the automobile business and the men engaged in it are entitled to legitimate banking accommodations and credit, and to constructive assistance from their bankers. In order to help liquidate the present expanded condition of bank loans, banks are now requiring all merchants who are ABUSING THEIR CREDIT to reduce their loans to a reasonable amount, NO MATTER WHAT BUSINESS THEY ARE IN. Vigorous action along these lines is a good thing for the business of the country, because it will bring down prices and force plungers to be conservative. Automobile dealers who are not abusing their credit, but are using it in reasonable amount, have nothing to fear, as their business is desirable, and wide-awake bankers appreciate it. Competition exists in the banking business as it does in every other, and desirable accounts are sought after by constructive bankers.

"If any of our dealers have to move their accounts from banks which refuse to take care of their reasonable requirements, we would be pleased to have them write us the facts in the case, and if desired, we will be glad to assist them in making other banking connections."

TIRES SHOW TENDENCY TO DROP

NEW YORK, May 21—A survey of many of the smaller tire companies discloses no tendency on their part to increase prices again. On the contrary it would not be surprising if there were a reduction in the fall. All the smaller tire plants are operating profitably, although they are suffering like other manufacturers from transportation difficulties. Long staple cotton for tires is scarce but they have been able to obtain supplies sufficient to keep going.

Both the large and small tire makers are depending more and more on motor trucks for transportation of raw materials to the plants and distribution of the finished product. Most of them are sending their tires away in trucks but little attempt is being made to give deliveries by this means outside a radius of 150 miles. As a result of the rail tie-up Akron and the tire district is loaded up with unmovable product and this situation is believed to make for continuance of low prices.

Kansas City Bankers Cut Tractor Credits

KANSAS CITY, May 25—It is reported that bankers are far less cordial toward tractors than a year ago; and that they are deterring farmers from buying tractors except when the farmers can show definite advantages from ownership. Most bankers are requiring farmers to demonstrate that the investment in a tractor will bring a pronounced saving in operation or a pronounced increase in production without too large a cost.

Some bankers are requiring farmers who buy tractors with borrowed money to sell off a certain number of their horses. It is harder for farmers in some districts to get money for tractor purchases than it is for them to get money for passenger car or truck purchases.

Road Builders Demand Service on Materials

COLUMBUS, May 24—Vigorous protests on any priority order which would prevent rapid movement of road building materials have been made by Charles H. Duncan, secretary of the Ohio Contractors' Association, and others to the Interstate Commerce Commission. It is urged that anything which would tend to hamper the movement of road materials would be a great detriment to the road building program. The road improvement program is necessary to encourage the ship-by-truck movement, which is relieving public needs in these times of stress, the association declared.

TRUCK SHEETS TO DETROIT

PITTSBURGH, May 24—With approximately 1,200,000 tons of finished steel loaded on cars which are tied up in the yards of the Pittsburgh district, manufacturers are resorting to every possible means of making deliveries. Some of them, notably the Jones & Laughlin Steel Co., are hauling their product to customers on motor trucks. Jones & Laughlin have sent some sheets as far as Detroit in this manner to meet the insistent demands of automobile makers.

REO GETS BOAT SHIPMENTS

HOLLAND, MICH., May 25—Material for the Reo Motor Car Co. at Lansing is arriving in Holland by boat and being transported overland by trucks to the factory. The freight congestion necessitated resort to the boat line, and large consignments are being received daily.

Railways Propose Check on Highways

Would Hold Work to Minimum to Release Men and Materials

NEW YORK, May 24—The Association of Railway Executives has under consideration a proposal to the Interstate Commerce Commission and the public utilities commissions of the various States that construction work on highways be kept down to a minimum so that additional labor and materials may be released for use of the carriers. This is in line with the contention that steel should be diverted from the manufacture of automobiles to the making of freight cars and other equipment.

The Eastern carriers assert that there is a widespread use of coal cars for transportation of road building materials. While the Interstate Commerce Commission would have no jurisdiction over road building, it could cut off shipments of materials by priority orders if it were so inclined. There is no intimation as to what stand it will take. It has not been made clear in what way the Government could help the railroads get labor if work in other lines were stopped.

The Federal Highway Council is watching the situation and will oppose as far as possible, the placing of road-building material and equipment in the non-essential class, because it believes that with the main lines of transportation broken down, it is extremely important that work should continue on such roads as serve important traffic centers. The highways are called upon daily to handle increased traffic burdens. Their improvement has been neglected for almost three years and further neglect would deprive the public of their use in the present emergency when they are most needed.

Rates Make Truck Important

"It is absolutely necessary that motor truck transportation be organized at every possible point and as much freight as possible sent over the highways," says a statement issued by the Federal Highway Council. "The motor truck is destined to play an important part even though the congestion is promptly relieved because of the high advances which it will be necessary to make in both freight and express rates. The express companies are now asking from 10 per cent to 25 per cent increases in rates at hearings just started in New York by the Interstate Commerce Commission.

"The Railroad Labor Board, sitting in Chicago, is being asked to pass on a $1,000,000,000 increase. Already a $1,000,000,000 increase has been granted since the beginning of the war. The railroads are in absolute need of equipment amounting to $1,000,000,000, all of which necessitate greatly advancing freight and express rates to such an extent that much traffic not heretofore found on the highways will be handled immediately by motor truck."

Sacrifices Needed for Economic Good

Too Much Credit and Too Few Goods, Finds Hardware President

NEW YORK, May 24—Robert H. Treman, deputy governor of the New York Federal Reserve bank and president of the National Hardware Association prepared a striking statement on "The Future Outlook," which was read at the annual meeting of the hardware men. He touched upon the situation both from the mercantile and financial viewpoints in view of the unprecedented high level of prices and the stringent credit conditions. In his review Treman said in part:

"The world to-day is facing the most difficult financial and economic situation in history. There is constant revolt against high prices, and yet prices continue to rise at the rate of 26 per cent increase in commodity prices from April 1, 1919, to April 1, 1920. This is due fundamentally to there being too much credit and money and too few goods.

"It is evident that this country cannot go on boosting wages and prices, curtailing production, attempting to enrich ourselves by non-productive speculation, without fostering further discontent and radicalism, as well as bringing on a crisis sooner or later.

"Individual banks report demands for loans constantly increasing to finance business on the present high prices, and as the supply of credit diminishes the rates increase.

"Increasing high rates of credit is the natural and automatic movement to correct money evils.

"There must be a recognition of the fact that, however desirable on general principles a still further increase just now of trade and industry may be, this must accommodate itself to the actual facilities for capital and credit, or else be prepared to meet a more serious situation later.

Demands United Effort

"The situation clearly demands the effort on the part of the bankers, manufacturers and distributers to co-operate in every way to keep conditions sound.

"Large stocks at the present level of prices are undoubtedly an element of danger. Commitments as to the long future may prove unwise. Conditions as they develop should be carefully watched and studied. There should be co-operation on the part of individuals and corporations in an effort to hold the situation in check.

"The time is ripe for everyone to make personal sacrifices for the general economic good. The disinclination to do this so far is one of the disturbing signs, but it behooves every patriotic business man to realize the seriousness of the situation and to co-operate to the fullest extent in an effort to consume less, especially of luxuries, to encourage a greater production of food products, to avoid speculation of all kinds, which ties up credit now needed for the development of our export trade as well as the domestic needs.

"While there is much apprehension prevailing at the present time as to the future, it is evident that the necessary deflation of prices and the lessening of the credit tension can be much facilitated by a full realization of existing conditions, coupled with sane and proper efforts to control the situation so that confidence shall be maintained."

Vulcan Axle Company Starts Detroit Plant

DETROIT, May 24—Vulcan Motor Axle Co., composed of men prominent in the industry for many years, has started operations in Detroit. F. C. Gilbert, president of the company, is widely known in the axle branch of the industry since the early days and has surrounded himself with officers and directors, with most of whom he has been associated closely for many years.

The new concern is capitalized at $1,000,000, and will build a complete line of axles for motor vehicles. A large plant has been obtained on Milwaukee Avenue and equipped with modern machinery for the production of high-grade axles. Portions of the plant already are in operation and production will start early in the fall.

Officers of the company besides Gilbert are F. B. Weaver, vice-president; Sidney C. Love, vice-president; C. C. Miller, vice-president; J. T. Hanlon, secretary; R. G. Beechler, chief engineer.

Ford Blast Furnaces Start Iron Production

DETROIT, May 24—The first of five Ford blast furnaces at River Rouge, which eventually will manufacture all the pig iron used by the Ford Motor Co., was started this week. Henry Ford II, three-year-old grandson of the manufacturer, touched the match which started the first blaze. A second furnace will start within 30 days, and as rapidly as construction will permit the other three will be put into operation.

The furnaces will each turn out 100 tons of iron every 24 hours, and a large foundry will be built in connection to handle the molten iron which will be poured directly into molds of automobile and tractor parts. Millions of cubic feet of gas will be produced daily by the furnaces and will be used in the plant operation.

SPECIALTY BUILDS AT ALBANY

KENOSHA, WIS., May 24—The Specialty Brass Co. of Kenosha, Wis., is establishing a branch foundry and machine shop for producing brass specialties for the Eastern trade at Albany, N. Y. C. W. Anderson is now on the ground looking after the construction and equipment of the new shops, which are to be ready to start production in 90 days.

Sleeper Reiterates Belief in Revision

Wage Adjustment Only Means to Economic Relief, Says Michigan Governor

DETROIT, May 25—Governor A. E. Sleeper, who roused the ire of automobile employees in a prepared statement in which he urged wage revision, has declined the invitation of the employees to attend a meeting of automobile workers in this city to-night. The meeting was called for a general discussion of conditions, particularly with reference to the recommendations of Governor Sleeper. The Governor in his statement last week urged that a readjustment of wages was the real solution to the high cost of living problem. He said such revision would do more to readjust conditions in Detroit and other industrial centers than all of the acts the legislature could pass.

Declaring he was not in favor of low wages, but basing his argument on a special inquiry, the Governor declared he was sincere in his conviction that wage adjustment alone would bring the desired relief.

The Governor cited instances where boys from 18 to 20 years old are making from $7 to $11 a day, and urged instead of paying these wages to boys who contract expensive habits, men with families should be given preference. He said few of these young men have any bank accounts, despite their high wages, and declared they are spending their money more or less foolishly from pay-day to pay-day.

Conditions in Detroit, the Governor said, are abnormal and any benefits accruing to Detroit by legislative action, he said, would be of little benefit in other parts of the state, where no comparison would be drawn with Detroit. Reduction of wages, he said, would permit the manufacturer to reduce the cost of his product and that in the end would mean a reduction to the consumer.

AIRWAY TO LINK NATIONS

WASHINGTON, May 21—Three South American States—Brazil, Argentina and Uruguay—are to be lined up by a commercial airplane line, according to governmental information here. The route will be 2600 miles long and will touch at 12 important centers between Pernambuco and Buenos Aires, the terminal ports. Mail and passengers will be carried.

RUBBER MAKERS TO MEET

CHICAGO, May 24—The June meeting of the Mid-West Rubber Manufacturers Association will be held at the Chicago Athletic Association June 8. Members who expect to attend are warned that the Republican national convention will be in session at the same time and that they should make hotel reservations at once.

Detroit Establishes Efficiency of Trucks

Use of Fleets Keeps Factories Operating—Parts Hauled Long Distances

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trucks on the roads constantly, traveling to Indianapolis, Toledo, Pontiac, Grand Rapids and other cities hauling axles, engines and smaller parts. At the Scripps plant it was said a priority ruling would not stop the factory and officials felt confident of being able to continue operations in view of the fact that bases of supply are within a reasonable distance.

Maxwell-Chalmers is keeping a fleet of 25 trucks constantly on the road between Indianapolis, Akron, New Castle, Cleveland and Detroit bringing in castings, tires and machine parts. The company also has its own plant for the manufacture of castings and machine parts in Dayton, and keeps trucks moving between Dayton and Detroit and Grand Rapids and Detroit daily.

C. A. Brownell of the Ford Motor Co. takes an optimistic view of the situation. During the shut-down in April, because of the lack of coal, Ford operated a large fleet of trucks and hauled an average of approximately 300 tons each day into the factory from Toledo and other supply bases. To-day, however, Brownell said, the factory was depending entirely on freight trains and railroad crews with the Ford traffic departments and Ford crews co-operating. Brownell said the output of the factory yesterday was 3,275 cars and trucks, and declared 3,100 a day had been the minimum for the last 10 days. Of this number between 600 and 700 cars are being driven from the factory every day.

Buick Motor Co. at Flint also is depending chiefly on the railroad, though the company is operating some trucks in bringing in materials from short distances. Where it is impossible to get freight into the factory at Flint the company meets the trains with trucks at the nearest point and hauls overland.

Reo Reaches Distant Points

Reo Motor Car Co. at Lansing has a fleet of trucks on the road and has had it moving constantly for more than a month. Reo is trucking as far as Syracuse and Milwaukee and is hauling much material from New York, Philadelphia, Chicago and Muskegon. No attempt is being made to bring the heavier parts by truck, but all of the castings, bearings and smaller parts are coming by that route.

Dort Motor Car Co. at Flint is using trucks, interurban and the express route in aiding the railroads. Dort is operating trucks between the factory and Toledo, Cleveland, Detroit and Saginaw, hauling small parts.

It was said by Dort executives that while the trucks have proved the salvation of the industry in the present crisis, they would be of little avail in the event of a priority ruling, discriminating against the automotive industry. They declared production could not be maintained at more than 20 per cent by the use of trucks.

At the Paige factory it was said they were operating four trucks, making trips twice a week between Cleveland, Toledo and Detroit, and in addition were using the interurban express lines wherever possible in bringing in small parts.

Hudson-Essex has resorted to the truck method in maintaining production, but even with that assistance the company's output is being curtailed and April production will show a large deficit. Hudson is relying chiefly on the railroads and boat lines, however.

Production Depends on Rails

The same may be said of Packard Motor Car Co. Officials there said to-day that while the trucks were proving a great help and were permitting the company to continue operation, the idea of maintaining production without the railroads was out of the question. There are not enough trucks in existence to handle the volume of traffic necessary to keep Detroit factories in operation, Packard officials said, and even if there were trucks the roadways would not stand it.

Hupp Motor Car Co. has been fortunate in the fact that it had considerable supplies on hand when the railway strike came and has been able to get freight shipments right along, though not in anything like the normal amount. The company is trucking to Jackson, Toledo and nearby cities and railway points wherever necessary, but in the main is dependent on the railroads.

The same situation exists with all of the smaller companies, though the traffic demands would not be so heavy as in maintaining the production of the larger factories. Some of the smaller plants have steel supplies that would enable them to continue operation for from 30 to 90 days and sufficient smaller parts could be brought in by trucks to keep them operating.

Events at Washington are being watched closely and manufacturers hesitate to make any prediction, declaring there is no telling what to-morrow may bring forth.

Export Shipments Shrink $136,000,000 in Month

WASHINGTON, May 21 — Exports from the United States during the month of April showed a decrease of $136,000,000, in comparison with March, according to figures just published by the Department of Commerce. The totals for the two months were announced as having been $684,000,000 and $820,000,000. In April of 1919 the total was $715,000,000. These figures include exports of all descriptions.

Imports likewise registered a decline, the figure being $29,000,000 less than March. The April total was $495,000,000, while March showed $524,000,000 and April, 1919, $273,000,000.

Car Production Firm at 65 per cent.

Schedules Will Be Maintained at Present Figures—Market Conditions Better

NEW YORK, May 25—The passenger automobile manufacturers have accepted gracefully the inevitable inconveniences caused by the process of deflation through which the country now is passing. They realize, according to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, that production must be curbed to a certain extent because of the credit situation. On top of this has come the railroad collapse which has made mandatory a curtailment greater than otherwise would have been necessary. They will exert every resource to keep factories going up to the limits possible under conditions which now prevail.

Production is now at the rate of 65 per cent of the manufacturing schedules, Reeves said, and every effort will be made to keep it up to that figure. There is a disposition on the part of manufacturers to feel that they were buying a bit too heavily. This resulted in a rather arbitrary attitude on the part of some of the companies of which they were customers. A buyers' market is now being restored, although some of the plants are short of engines, glass, etc.

Reports received by manufacturers show that there has been some slowing down in the business of dealers. They took their spring orders in January and February and are making deliveries now of cars ordered then. Business coming in at present is about on the scale which might be expected in June and July. Some bankers are disposed to curb credit to dealers, but those who are well established are having little trouble in getting funds for legitimate needs.

The message of the N. A. C. C. to dealers is to sit tight and not get panic stricken. The demand for cars is strong and there is every reason to believe it will continue strong. They will have no trouble in finding a market for all the cars they can get. Where credit restrictions are most stringent now they will be likely to loosen up when the rail jam is relieved and there is no intention on the part of government authorities to discriminate unjustly against the passenger car industry.

NAPOLEON USES STEAMER

TRAVERSE CITY, MICH., May 22—Napoleon Motors Corp. and other Traverse City manufacturers have acquired the steamer Anna C. Wilson of the Morgan Transportation Line to assure them of supplies by water. On its first trip the vessel brought in rear axles and transmissions which enabled Napoleon to complete a large shipment of trucks. The plant is now operating without difficulty. The boat sails from South Haven, Mich., stopping at Muskegon, Milwaukee and other manufacturing cities along the route.

Highway Officials Slow Truck Shipping

Attitude of Pennsylvania Deputies Shows Entire Lack of Co-operative Spirit

HARRISBURG, PA., May 24—Every unfortunate incident tending to hinder inter-city trucking has a vast effect upon the movement as a whole at this primary stage of development. Two incidents occurred recently which illustrate very strikingly the sort of thing which is slowing up the progress of the ship-by-truck movement.

During the height of the recent railroad strike, 100 five-ton trucks were hired in New York and New England to bring fabric from the mills at Goodyear, Connecticut, to the factory in Akron. The fleet owner of Pawtucket, R. I., together with a New York man, who was hauling similar loads for the Firestone Tire and Rubber Co., started over the Lincoln Highway for Akron.

Being familiar with the laws, particularly those of Rhode Island, these contractors refused to accept more than the amount permitted to be carried on the Rhode Island highways. They were very careful in loading the trucks, in one case refusing to take an extra bale of fabric for fear of exceeding the load limit. When they got into Pennsylvania at a town called Saluvia, they found that the surface had been removed from the road for a distance of about a mile and a half preparatory to resurfacing. The contracting company was supposed to have maintained a suitable detour around the new construction.

There was a detour through mud which, of course, had become impassable to heavy traffic in a very short time. When these fleets arrived, it was impossible for trucks, touring cars, or anything else to use it. The road on which work was being done was blocked. When some eighty or ninety touring cars and trucks had accumulated and asked to go through, they were refused by the foreman of the construction gang.

Pitched Battle Threatened

A pitched battle almost ensued between the foreman and truck drivers, but the former remained obdurate and refused to allow them passage. The argument lasted from one o'clock in the afternoon until one o'clock at night. During all of this time, the construction company's five-ton trucks, loaded with gravel, stone, and other material, were operating over the piece of highway through which the waiting trucks with fabric were not allowed to pass.

During the night one of the men communicated with the highway department at Harrisburg, but was unable to get much help in having the road opened. The next day around noon time, the foreman appeared and stated that he was ready to open the road, provided each vehicle paid him $20 in cash for the privilege of driving through. In less than ten minutes he had collected about $1000.

Although this foreman was later instructed by the State Highway Department to return the money, many tourists and private car owners did not demand a receipt, as did the fleet owners of the fabric trucks, so that most of the money will never get back to those who paid this modern highwayman his toll.

A second incident occurred on this same trip, when the fleets arrived in Pittsburgh. There the State Highway Commissioner of Allegheny County stopped the trucks and held them during the entire night, in spite of bills of lading and the fact that they had already crossed hundreds of miles of Pennsylvania territory without dispute. This commissioner then weighed the trucks early the next morning and finding them within the required limits let them go.

Highway Officials Must Aid

These incidents seem to point out definitely the necessity for the State Highway Department to take transportation into consideration more definitely; to establish rules governing contractors and governing the operations of its deputies in the various counties.

Statistics show that it costs a truck about $20 to stay overnight in a town, so that such transportation means good business for the towns along the way. When local authorities oppose truck shipping through their towns, they are, consequently, neglecting their own interests as well as those of the country at large.

Cincinnati Planning Regular Truck Routes

CINCINNATI, May 22—Although Cincinnati automobile and truck manufacturers have been tied up for several weeks by strikes of machinists and automobile mechanics, they have given much attention to truck transportation for raw materials. One firm has put in this method for permanent use and others are working out plans.

G. A. Schacht Motor Truck Company has brought 20 truck loads to Cincinnati from Detroit, Chicago and New York within the last 30 days. William Schacht, secretary, says this plan is the only safe way to insure delivery, the greater cost being offset by the element of time. He expects to make it permanent.

The Otto Armleder Company has brought some materials from Richmond and was arranging for trucking from Fort Wayne when plant employees went out. The plan has been abandoned.

The Cincinnati Ball Crank Company has laid out several truck routes for raw materials but has not as yet been forced to use them.

TAKES OVER MENOMINEE PLANT

MENOMINEE, MICH., May 24—Charles Janson, proprietor of the Ford garage, has taken over the building occupied by the Menominee Motor Truck Co., which will soon occupy its new factory at Clintonville, Wis. Janson plans to manufacture truck bodies.

Tire Factories Get Fabrics by Truck

Fleet of 100 Make Run from New England to Akron in 102 Hours

AKRON, O., May 22—What is probably a record achievement in long-distance hauling by motor truck is the feat of 100 of these commercial vehicles in transporting 1,000,000 lbs. of fabric worth $2,500,000 from the mills of New England to the Goodyear Tire & Rubber Co. factory in Akron during the transportation tie-up. These 100 motor trucks carried an average of 10,000 lbs., and while some of them were on the road for an entire week, the average running time was 102 hours for the distance traveled, which was 750 miles from Providence, R. I., to New York and thence along the Lincoln Highway.

The trucks were mobilized in the vicinity of Providence and sent to the various mills to take on the fabric which had been accumulating ever since the rail situation became so desperate that shippers had been unable to get commodities through on freight cars. Some fears were expressed that because the trucks were on solid tires and of five-ton capacity and loaded with five tons of fabric that they would have difficulty in negotiating the road through the Allegheny Mountains. There was, however, no unreasonable delay in the transportation of this fabric to the factories in Akron. Among the tire companies that took advantage of the highways to transport their fabric by motor truck were the United States Tire Co., the Firestone Tire & Rubber Co. and the Miller Rubber Co. The B. F. Goodrich Co. of Akron also found it necessary to have a number of trucks bring in fabric, but not on such an extensive scale.

Loads Average $25,000 Value

Each load was insured for $25,000, the fabric being worth $2.50 a lb. The movement of fabric is said to be the biggest truck transportation venture from the East both in point of distance and volume of shipment. It was necessary in order to secure the trucks at Eastern points to contract for a round trip haul. This meant the hiring of trucks to transport for a distance of 1500 miles, the distance one way being 750 miles. When the caravans arrived in Akron they were immediately loaded with products such as rubber heels, soles, tires, tubes, cement and accessories in connection with the tire business that were destined for points in the East, including cities from New York to Boston.

Use of the trucks is being continued as long as the railroad strike is affecting shipment by freight. The success of the tire companies in having this fabric sent by motor truck over such a long distance has caused other manufacturers to adopt this method. The time made by the trucks also offers a special inducement for their continued use whether the congestion is prolonged or not.

I. C. C. Committee to Unravel Service

Selection of Terminal Board With Arbitrary Powers Arouses Apprehension

WASHINGTON, May 25—Instructions issued by the Interstate Commerce Commission for the creation of terminal committees to operate at important railroad terminals, gives full recognition to the motor truck as an essential utility. Other sections of the order, however, afford concern to traffic men in the automobile field because of the broad powers conferred upon these committees. The question has arisen as to whether or not they would force the movement of passenger cars away from the factories under their own power or even cut off movement of supplies to the plants. There is evidence in some quarters of such a disposition.

No. 7 in the list of subjects for the committee to inquire into reads "to use every effort that orders for placement of cars shall conform to the actual necessities of the proposed movement, and to discourage waste and needless transportation during the present emergency." The point which gives ground for some uneasiness deals with the judgment of these committees in the interpretation as to what constitutes "needless transportation." Their recommendations might, in fact, be equivalent to a priority list though no such schedule was officially given out by the Interstate Commerce Commission. Many traffic officials believe the passenger cars would not fare well under preferential distribution of freight equipment.

The commission has advised the committee to keep in close contact with the shippers at the terminals. They are urged to study the situation carefully, confer with all interested parties and adjust traffic matters whenever possible without calling upon the commission for assistance. The committee will act in an advisory capacity to the Commission on Car Service which will have charge of the operating work.

Will Use Coal Cars for Coal

Complaint of the Michigan public utilities commissioners against alleged misuse of coal cars by automobile manufacturers has been indirectly answered in the order to the terminal committee "to use every effort to prevent the abuse and misuse of equipment and especially coal, refrigerator, live stock and grain-loading cars; and to use every effort to see that the use of these cars for the time being is confined as far as is reasonably practicable to the primary purposes for which they were built." This order, it is said, indicates the commission will accede to the requests of the Michigan shippers that a check be placed against certain manufacturers of passenger automobiles.

The list of terminal committees as appointed by the Interstate Commerce Commission contains but one man who is directly connected with the automotive industry. A. L. Viles, general manager of the Rubber Association of America is the shippers' representative on the terminal committee at New York City.

Priorities Not Likely

NEW YORK, May 27—Robert S. Parsons, general manager of the Erie Railroad, said no priority orders on shipping had been issued by the commission and none were expected unless the terminal committee plan of determining essentiality of shipments proved incapable of meeting the situation. Concerning automobile shipments he said:

"Under this system there will be no discrimination against passenger cars any more than against hundreds of other commodities. They must give place, however, in shipping preference to foodstuffs and articles of industrial importance. The automobile industry will be affected more than other industries only because of its greater requirements.

"The principal effect of the Interstate Commerce Commission action thus far is the short routing of cars. This means that cars will be shipped over roads better able to handle them than the ones over which they are routed. Under this system thousands of cars are being cleared out of Eastern terminals daily to bring in food supplies from the South and West."

Harding Amplifies Position on Credits

NEW YORK, May 26—W. P. G. Harding, governor of the Federal Reserve Board, has sent to Alfred Reeves, general manager of the National Automobile Chamber of Commerce, a letter outlining his views on the stand which should be taken by individual reserve banks relative to automobile paper. It was contended by the chamber that serious injury was being done the industry by the bald assertions made by officers of Federal Reserve banks, especially at Kansas City and Atlanta, that passenger cars were "luxuries."

In his reply, Harding took the position it was not for the reserve banks to determine what are and what are not essential industries. He holds that the general policy of the board in relation to the deflation of credit has been outlined to member banks and they have pledged their support. For this reason he feels the responsibility of deciding what paper should be discounted should rest on these members rather than on the district reserve banks. Harding feels the bankers individually are in a better position to determine to whom credit should be extended. He makes the point that there can be no hard and fast rule in this respect. While automobile paper may be as good as wheat in one district or city it may not be in another.

Government Acts to Conserve Gas

Illuminating Gas Makers to Adopt New Methods—Navy Modifies Standards

WASHINGTON, May 26—Evidence is growing that the United States Government intends to co-operate with the automotive industry in holding down the price of gasoline and oil. The Bureau of Mines has advised gas companies manufacturing illuminating gas to adopt another method which will not hinder the efforts of refiners to improve the gasoline supply. The Navy Department in awards announced to-day for 5,200,000 bbl. of fuel oil has allowed slight modifications in its standard specifications in order that Mexican crude oil could be utilized on a larger scale. The awards give the navy 15,792,000 gal. of gasoline for the coming year with options for contract renewals to insure delivery of 3,000,000 bbl. of oil and 15,792,000 gal. of gasoline for the following year.

Notice has been sent to the artificial gas companies that it is essential for these users of oil to develop other processes. Director Cottrell of the Bureau of Mines has suggested that it would help matters along to abolish the candlepower standard for illuminating gas. He points out that it is obvious that gasoline users will pay more for distillate gas oil than these companies could afford with present gas rates. The director explains the oil shortage as follows:

"The principal reason for this shortage has been the development of cracking processes whereby this oil is manufactured into gasoline to meet the increasing demand of automobile owners. The number of automobiles, trucks and tractors being put into service is increasing with such tremendous strides that it has become necessary to use more and more of the gas oil for cracking purposes. And as it can be anticipated that this demand will increase rather than diminish, the question of supply will grow more instead of less critical.

Would Add Large Supply

"Gas oil or distillate fuel oil is only one of the fuel oils now on the market. Some 55 per cent of all petroleum produced or imported into the United States is consumed as fuel or gas oil. Of this the larger proportion is the heavy tarry oil, which is variously termed residuum, reduced crudes, topped oils, bottoms or heavy crude. Along the Pacific Coast and among the Western States this heavy oil has been used for many years for making artificial gas, and can also be used for enriching gas made from coal or coke, though it has qualities which make it less desirable than distillate gas oil. At the present time this heavy fuel oil is not being cracked to any considerable extent in making gasoline, but is being used mainly in steam plants and for heating. There is, therefore, a large quantity of heavy fuel oil available for gas making.

Allen Motor Goes into Receivership

Factory Will Continue in Complete Operation Until Stability Is Re-established

COLUMBUS, May 22—Alleging that its claim for $7,402 for materials furnished the Allen Motor Co., of Columbus, is due and remains unpaid, the Connecticut Telephone and Electric Co., brought suit in the United States District Court to-day for the appointment of receivers for the debtor company. George A. Archer, president of the Commercial National Bank, and W. C. Willard, president of the Haydon-Clinton National Bank, were named receivers with bonds fixed at $100,000, which were furnished immediately.

The petition of the plaintiff alleges that the assets of the Allen Motor Co. consist largely of finished motor cars, cars in process of manufacture and parts and that it is advisable that the plant be kept in operation. It is claimed that certain other creditors are demanding their money and that there was danger of having the assets dissipated.

C. B. Miller, who has been production manager of the plant, was immediately made general manager, and plans were laid for continued operation. No schedule of assets and liabilities was filed with the petition for receivers. Stockholders of the company declare that the financial troubles are due mainly to lack of sufficient working capital. At a recent meeting the stockholders voted unanimously for the reorganization plans which were being worked out by F. R. Huntington of the Huntington National Bank.

Under the reorganization plan the bankers' committee was to provide $350,000 in cash and the stockholders a similar amount, the $700,000 to be used as working capital. In addition $1,000,000 of 7 per cent notes were to be issued redeemable in six month periods of $100,000 in each period. Some of the creditors refused to accept these notes for their claims and demanded cash, which is largely responsible for the receivership. The refinancing plans will go forward under the receivership, but there are serious doubts as to whether they will be successful. The merchandise liabilities are estimated at $1,400,000.

Willys-Overland Denies Wage Reduction Rumor

TOLEDO, May 24—Reports that the Willys-Overland Co. had planned to reduce wages are emphatically denied by Clarence Earl, vice-president.

"We do not contemplate any reduction in wages," he said. "On the contrary we propose increasing our weekly pay roll by the addition of mechanics and laborers where it is possible to get them. Neither do we contemplate shutting down. Lack of transportation facilities has interfered somewhat with the receipt of some raw material, but we look for this condition to be remedied in the next few weeks. We are turning out 600 finished cars daily and the greater number of these are driven away to their destinations.

MAX D. BENDEL DIES

CHICAGO, May 24—Max D. Bendel, manager of the Twitchell Gage Co., died suddenly of heart disease just after he had alighted from a suburban train on his way to business. He succeeded to the management of the company just after it was acquired by A. Schrader's Son, Inc., of Brooklyn in 1912.

Passenger Bus Used by Brooklyn Company

The American Mfg. Co. bought six 3½-ton Republics and equipped them with bodies built by the Paterson Vehicle Co., to transport employees to and from its Long Island City factory. The buses each carry 40 passengers and helped solve the labor problem for the company.

Cincinnati Firms Turn Down Strikers

Prepare to Maintain Stand for Fair Day's Work for Fair Day's Wage

CINCINNATI, May 24—After having been tied up for the last three weeks by city-wide strikes of machinists and mechanics, the Cincinnati truck and automobile manufacturers plan to re-open their plants "on or before July 1," with a full force of employees in all departments.

The plants will refuse to recognize the labor unions in resuming their operations, it is announced. This attitude is taken in a statement of principles and policies issued over the signatures of the Otto Armleder Co., G. A. Schacht Motor Truck Co., United States Motor Truck Co. and Sayers & Scoville Co., four firms now tied up by the strike.

The policies of these companies are announced as follows:

"To base the pay of all employees solely upon their individual skill, ability and industry.

"To pay employees as high wages as their individual ability entitle them.

"To expect from each employee an honest day's work, performed to the best of his or her ability.

"To establish reasonable working hours and maintain proper working conditions.

"To protect every man and woman in the lawful exercise of his or her natural rights to work where they please, and earn up to the limit of their capacity.

"To deny the right of the radical agitator, the walking delegate or so-called labor leader to interfere with the management or operation of our business."

Commenting on this plaform, the companies declare they "believe these principles to be entirely fair," as they "put a premium on genuine merit and ability."

The strike has been conducted so far entirely without violence, except in one or two minor cases.

PATTERN COMPANY ORGANIZES

RACINE, WIS., May 24—The Western Eagle Mfg. Co. has been organized at Racine, Wis., to manufacture wood and metal patterns for the automotive foundry trade. It has a capital stock of $50,000 and is formed by Miller Peterson, Earl Albert and Jean Diehl, all of whom are experienced in pattern working and have been associated with Racine shops for many years.

STEEL HAULED BY TRUCK

YOUNGSTOWN, May 24—Because of the present disturbed conditions steel makers in this district are entertaining no new business of any kind. They are meeting some of the difficulties of delivery by the use of motor trucks for short hauls. Fabricating interests also have been able to keep their plants active by importing steel from nearby producers in trucks.

Gasoline for Cars Reduced on Coast

Fuel Rationing, Rail Congestion and Restricted Credits Decrease Business

SEATTLE, May 24—Gasoline rationing along the Pacific Coast from San Diego to this city has increased in the past week due to a temporary shortage occasioned by the railroad congestion. In northern California and Oregon passengers cars are sold 3 gal. each in smaller towns, but in larger cities where large supplies are carried rationing has not started.

In some interior cities gasoline supplies became exhausted for a day or two at a time. Prices have not increased and in Oregon, where the State's compulsory gravity law was set aside last week, the price has been reduced 1½ cents a gal. Oil companies along the coast agree that consumption of fuel by passenger cars must be reduced 20 per cent to allow fuel for all.

In addition to the fuel shortage, cars are still being held up due to non-delivery. One Portland dealer had six sales cancelled last week. Dealers along the coast report a general slackening in business on both new and used cars. In Oregon wet weather and gasoline shortage had a deterrent effect on sales.

Banks in tightening up on car and truck paper have had a retarding effect also. Distributers in a number of instances have diverted cars from dealers in small towns because of inability to secure money from banks to finance the sales. Those banks continuing to advance money on car sales have cut their advances from 80 to 70 per cent of the value of the car. This attitude of the banks is reflected in sales along the coast where perhaps 90 per cent of all sales are made on a time payment basis.

WOOD WHEEL MAKERS TO MEET

LANSING, MICH., May 24—President C. C. Carlton of the Automotive Wood Wheel Manufacturers Association has called a special meeting to be held at French Lick Springs, Ind., May 28 and 29. The purpose of the meeting is to hear the report of a research engineer employed by the company for several weeks. Carlton, who is secretary of the Motor Wheel Corp., will be accompanied by J. B. Siegfried, chairman of the passenger car divison and Andrew Van Halteren, chief engineer of the Motor Wheel Corp.

OFFERS INDUSTRIAL COURSE

STATE COLLEGE, PA., May 24—A course in Industrial Organization and Management is being offered for the fifth consecutive year at the Pennsylvania State College from Aug. 9 to Aug. 21. Its purpose is to assist men in the development of their jobs, and the entire course is of an intensely practical nature. A great portion of the time is devoted to practical installation of methods, using the equipment of the college which is especially designed for this type of work. Five shops are kept in constant commercial operation and provides an immediate opportunity for the men to practically apply the classroom material. The roster of former courses includes the names of prominent production managers, employment managers, accountants, and others high up in executive work.

Indianapolis Factories Are Kept in Operation

INDIANAPOLIS, May 22—Practically every Indianapolis motor car and parts factory, as well as many in Indiana, are trucking materials and parts from the source of supply to keep production going because of the inability of the railroads to furnish transportation.

Queries directed to Indianapolis factories show that at least the vital things are being carried by motor trucks where an emergency exists, although the shipping situation into Indianapolis is better now than it was several days ago. The motor truck will be relied upon, however, if conditions change for the worse.

The Cole Motor Co. has been carrying engines from Detroit and other supplies from Toledo and kept production at a high scale. Marmon has been carrying material from Detroit, Cincinnati and Dayton. But now, with better service from the railroads, shipments via motor truck will be decreased. Shipping materials by motor truck, it was said at the Marmon factory, was satisfactory only as an emergency.

National has been trucking vital parts only. Premier is trucking a large part of its supplies to the factory from Dayton, Cleveland and other points in an effort to keep up a regular monthly schedule of 500 cars. The Premier officials said they were 700 cars behind and that this inability to get material, especially axles and frames, was slowing up output.

Wheeler Schebler has a big supply of material on hand and has not been using the motor truck but may do so in shipments of carbureters to the branch at St. Louis.

Continental motors have been brought to Indianapolis by motor truck, these same trucks carrying back castings. With better express service, these motor truck shipments have decreased lately.

STINSON TRACTOR DELAYS PLANS

EAU CLAIRE, WIS., May 24—The Stinson Tractor Co. of Minneapolis, which announced some time ago its intention to concentrate its productive facilities in a large new plant with a daily capacity of 25 tractors at Eau Claire, Wis., has postponed the project because of unsettled conditions in the construction field. Until it is deemed feasible to proceed, the main assembling plant at Superior, Wis., will be continued in full operation, with an output of three to four tractors a day.

Canada Takes Cars From Luxury Class

New Budget Removes Excise Tax from Trucks and Raises Passenger Tax

TORONTO, May 22—Under the new Dominion budget passenger automobiles are not only no longer singled out as the cap sheaf luxury, but are no longer officially classed as a luxury. It is recognized by Ottawa that the passenger car is a utilitarian necessity and a great national asset.

When Sir Henry Drayton, minister of finance, delivered his maiden budget speech, he announced that the 7½ per cent war excise tax on passenger cars and trucks had been swept away. This is a net reduction of 7½ per cent on motor trucks imported. The excise tax of 10 per cent on passenger cars was increased to 15 per cent but it does not apply to trucks or other commercial vehicles.

A one per cent tax on sales by manufacturers and jobbers was imposed. Presumably this makes a total excise tax of 16 per cent. If so, on cars imported from the United States per $100 manufacturer's cost the total Dominion impost is now $56.60 as against the former $56.75—or a decrease of 15c. This simple computation for obvious reasons does not take cognizance of the fluctuation of exchange or the United States war tax.

The Canadian motor car manufacturer does not get off so well. Indeed, other things being equal, the lower the value of parts he imports (and to import only about $100 worth of parts per car) the worse off he is, it would seem. For instance he is compelled to absorb in his car's selling price not only his own one per cent (and of course the 15 per cent excise) but the one per cent charged against the various Canadian manufacturers making parts used in his car—some of which from the raw material to the finished part pass through the hands of several manufacturers, each of whom add cumulatively his one per cent to the cost. The high car costs are largely due to this system.

Canadian Industry Pleased

It is true, too, that the Canadian motor car manufacturer has had his protection reduced by the withdrawal of the 7½ per cent war import tax. This tax, however, was imposed for war revenue and not protection purposes. In any event the Canadian motor car manufacturer is not mourning its demise, let alone protesting. Even with a slight increase in competition he is well equipped to meet it.

Two years ago the passenger car was singled out for excise taxation. To-day there is an army of products standing with it, not a few of which are called upon to bear a considerably higher excise import that the greatest of twentieth century time and labor savers—the motor car.

Drivers Ready for Indianapolis Race

Field of Thirty Will Strive for Winner's Slice of $85,000 Purse

INDIANAPOLIS, May 26—Everything is in readiness for the big Sweepstakes to be held here Monday. With special trains from distant parts of the country and automobile enthusiasts of the Middle West promising to attend en masse it is certain new attendance figures will be established. The track has capacity for 200,000 spectators, 60,000 of whom may be seated.

There will be thirty cars to start the race—twenty-one made in this country and nine made in France. The French cars are Ballot, Peugeot and Gregoire, A complete list of the entries follows:

Cliff Durant, Chevrolet; Ralph De Palma, Ballot; Jean Chassagne, Ballot; Rene Thomas, Ballot; Louis Chevrolet, Monroe; Gaston Chevrolet, Monroe; Roscoe Sarles, Monroe; Not named, Monroe; Joe Boyer, Frontenac; Arthur Chevrolet, Frontenac; Art Klein, Frontenac; Ray Howard, Peugeot; Jules Goux, Peugeot; Andre Boillot, Peugeot; Howard Wilcox, Peugot; Jean Porporato, Gregoire; Jack Scales, Gregoire; Jimmy Murphy, Duesenberg; Tommy Milton, Duesenberg; Eddie O'Donnel, Duesenberg; Eddie Hearne, Duesenberg; Waldo Stein, Oldfield; Tom Rooney, ReVere; Not named, ReVere; Ira Vail, Philbrin; Ralph Mulford, Mulford; Kurt Hitke, Kenworthy; John Boling, Richards; Willie Haupt, Meteor; Frank Elliott, T. N. T.

The total prize money to be distributed is $85,000. This is made up of the $50,000 purse for the winners; $20,000 for lap winners, awarded by Indianapolis business men and manufacturers, and $15,000 awarded by manufacturers of equipment to winners using their products. The purse will be distributed $20,000 to the winner; $10,000, $5,000, $3,500, $3,000, $2,200, $1,800, $1,600, $1,500 and $1,400.

The speed record for the race was made by Ralph De Palma in 1916 in a Mercedes—time, 5:33:55.51, an average of 89.84 m.p.h. Winners since 1911, when the first race was held, are Ray Harroun, Marmon; Joe Dawson, National; Jules Goux, Peugeot; Rene Thomas, Delage; De Palma, Mercedes; Dario Resta, Peugeot; Howard Wilcox, Peugeot. There was no race in 1917 or 1918.

Steinmetz Completes Experimental Work

BALTIMORE, May 24—The Steinmetz Electric Motor Car Co. has obtained quarters in this city for its engineering department and is considering three sites in this city for the location of its plant. The final choice will be made upon the recommendation of the executive committee. At least 100,000 sq. ft. of floor space will be required, with opportunity for expansion. It is hoped to be in production by fall. Operations will be confined for the present to 1½-ton trucks and experimental work upon them has been virtually completed.

Dr. C. P. Steinmetz, inventor of the car, said its chief characteristic would be lightness. He explained that it will be from 1000 to 1500 lb. lighter than any truck now made to carry the same rated load. This has been made possible by the special motor and storage battery which have been developed to provide the power. Power will be transmitted to one wheel only, which will permit elimination of the differential. The driving radius will be from 40 to 50 miles.

Ohio Tractor Succeeds Former Columbus Firm

COLUMBUS, May 24—The Ohio Tractor Co., with an authorized capital of $500,000, will take over the plant and property of the Columbus Tractor Co., and will soon begin the manufacture of a new model farm tractor embodying the Clarke double reduction rear system and other innovations. The incorporators of the new company are W. F. Garrett, D. W. Singleton, F. A. Miller, Foster Copeland and A. T. Seymour.

Officers have been elected as follows: Fred A. Miller, president; David W. Singleton, vice-presdent; A. T. Seymour, secretary, and W. F. Garrett, treasurer and general manager. These officers with Foster Copeland constitute the board of directors. B. C. Zuhars is chief engineer of the company.

In taking over the company the plan is to give one share of stock in the Ohio Tractor Co. for each share of preferred stock in the Columbus Tractor Co., and to give common stockholders Ohio Tractor stock on the basis of the actual value of the remaining assets of the defunct company. Directors of the Columbus Tractor Co. have approved the proposition.

The new type of tractor is designed for small farms and is of rather light construction. The trouble in the former tractor was with the transmission system, which would not stand the strain. This is said to have been eliminated.

FIAT REOPENS AFTER STRIKE

TURIN, May 1 (*Special Correspondence*)—After being closed for 31 days, the Fiat automobile factory resumed work yesterday. The dispute arose over the claim of the men to institute workers' councils in the factories. All the manufacturers opposed this movement and created a special fund to fight the strike. Police and military were used freely, all private automobiles were ordered to be withdrawn from the streets, and when threats of violence arose the automobile factories were closed down entirely. The men have returned without gaining any of the points for which they started the strike, but it is understood that the whole question of the relationship of workers and factory heads will be taken up when Parliament opens.

France Increases Tax on Automobiles

Latest Additions Will Bring Assessment 100 Per Cent Higher Than Before War

PARIS, April 24 (*Special Correspondence.*)—Additional and heavy taxes will have to be met by French automobile owners. On the ordinary taxes established in 1916 there will be an increase of 50 per cent, plus a road tax which begins at $20 a year for cars of not more than 12 hp., $40 for cars of 13 to 24 hp., increasing to $100 for cars of 61 or higher power.

In 1916 taxes were 50 per cent higher than in 1914, so that the motorist in future will have to pay 100 per cent more than before the war, plus the special road tax. In Paris a 14-hp. car will pay $138 per year in State taxes only, plus smaller local taxes on the car itself and on the gasoline it uses. Motor boats are to be taxed on the same basis as cars.

An additional state tax is also placed on gasoline, kerosene and lubricating oils. This will be at the rate of $4 per 26 gal. In order to encourage the use of "national fuel," which is gasoline mixed with French-produced alcohol, there will be a special reduction of 50 per cent for this mixture.

Foreign motorists touring in France are to be taxed for the first time. It has not been decided how much this tax will be, nor whether it will be collected when the car passes the customs authorities or after a month's stay. Horse vehicles also come in for special taxes, which begin at $14 for rigs with one or two seats, and increase to $40 for horse vehicles with six seats.

AUSTRALIA LIFTS BODY TAX

NEW YORK, May 25—Restrictions on the importation of automobile bodies into the Commonwealth of Australia were lifted as of the date of May 19, according to information received here to-day by Mark Shelden, the Australian commissioner in New York. This removes the previous ruling under which only one complete car could be imported into Australia for each two chassis.

This embargo forced many of the Australian companies into the making of bodies and, in view of the new tariffs of that country, which place heavy imposts upon such importations, it was considered here that much of this construction would be retained. The new Australian tariff, which provides preferential treatment for cars and other equipment from England, became effective some two months ago.

NAPOLEON STARTS GARDENS

TRAVERSE CITY, MICH., May 25—Napoleon Motors Co., in an effort to aid in cutting living costs, has plowed, harrowed and fertilized three and one-half acres of ground adjoining the plant, which will be apportioned among the 85 employees for gardening purposes.

INDUSTRIAL NOTES

Atlas Truck Corp. has elected John J. Watson, Jr., president and chairman of the board; A. R. Cosgrove, vice-president and general manager; Henry Hopkins, Jr., vice-president; Thomas Strauss, assistant treasurer; and E. J. Shepard, secretary.

Leatherman Tire & Rubber Co., Seattle, will build a plant for the manufacture of tires and tubes. John A. Leatherman former Goodyear branch manager is head of the new company. An initial output of 500 daily is planned.

Automotive Engineering Co., Milwaukee, has been reorganized with Walter H. Steinegger in active control. Henry J. Steinegger will be office manager. George Herman and Oscar Stegeman will continue as consulting engineers.

Emerson-Brantingham Implement Co., Rockford, Ill., has combined its export office with its permanent exhibit of farm machinery at the Grand Central Palace, New York.

Kane Pneumatic Shock Absorber Co., Centralia, Wash., is planning production of a new passenger car with a patented engine designed by P. W. Kane.

Paragon Motor Co., Uniontown, Pa., has completed experimental work on the car it is to build. The Uniontown factories will be built this summer.

Globe Automotive Syndicate, Philadelphia, has been formed to manufacture automobiles and light cars. The incorporators are South Jersey residents.

Occident Rubber Co., Everett, Wash., has bought a site for a 10-unit factory to cost $150,000 for the manufacture of rubber goods including tires.

Climax Rubber Co., Columbus, is making compression inner tubes at Huntington, W. Va., pending the completion of the Columbus factory.

Newtown Tire Co., Long Island City, is building a factory for the production of cord tires, which will be completed this summer.

Erdman-Guider Co., Saginaw, Mich., has awarded contracts for plant additions that will increase floor space 30,000 feet.

Columbian Bronze Corp. Executive and sales offices of the company have been moved to 522 Fifth Avenue, New York.

Acme Works, Inc., Indianapolis, will build a new pattern shop and foundry adjoining its present buildings.

Mytee Ignition Co. has moved its offices to 15 West Forty-fourth Street, New York.

E. Edelmann & Co., Chicago, opened a new factory May 24.

PRUDENTIAL TAKES OVER BOONE

CHIPPEWA FALLS, WIS., May 24—The Prudential Tire & Rubber Co. of Erie, Pa., has acquired the works of the Boone Tire & Rubber Co. at Chippewa Falls, Wis., and will resume operations at once, at the same time making arrangements for the erection of additions and installation of new machinery to bring the output up to 1000 tires and tubes a day by June 15. The Chippewa factory is one of five operated by the Prudential company. A patented cord tire, styled the Interlocken Woven Cord, will be put into production at the Chippewa plant at once.

Fred A. Seiberling, who recently retired from the New Castle Rubber Co., is president and general manager of the Prudential company. Gus M. Greenbaum, banker, Chicago, is vice-president; D. I. Stouch, Erie, is secretary and treasurer. A. G. Seiberling, vice-president and general manager of the Haynes Automobile Co., Kokomo, Ind., is a director. George N. Graham, formerly associated with English, French and German rubber companies, will be general factory manager at Chippewa Falls.

Ontario Regulates Truck Capacities

TORONTO, May 22—Despite urgent representations of the Ontario Motor Truck Owners Association the Ontario legislature has passed the bill limiting the load of trucks of more than 1-ton capacity to half their rated capacity on country roads during the months of March and April, except under special permit. The avowed purpose is to protect the highways. It is pointed out, however, that there will be another session of the legislature before the law goes into effect and in the meantime the government intends to investigate thoroughly the truck owners' contentions and modify the statute accordingly. The government has announced a desire to encourage motor transportation and does not desire to impose restrictive measures.

The truck owners asked to have pneumatic tired trucks excluded from the provisions of the law and conducted tests to prove to F. C. Biggs, minister of public works and highways, that they were less destructive to highways than those using solid tires. These tests were conducted on the Hillcrest race track. After witnessing them, Biggs said:

"Taking everything into consideration I should think that the pneumatic tires are best. They roll down instead of cutting."

KOHLER BUILDS NEW FOUNDRY

KOHLER, WIS., May 24—The Kohler Co. of Kohler, Sheboygan County, Wis., which some time ago engaged in quantity production of a new farm lighting system, is building a large foundry addition, 105 x 300 ft., to provide additional gray iron casting capacity required for this department. The Kohler Co. is recognized as one of the world's largest manufacturers of enameled bath-tubs and other sanitary ware and doubled the size of its plant for this purpose during the last two years, at the same time erecting additional shops to take care of the new farm lighting system output.

KLONDIKE AIRWAY PLANNED

NEW YORK, May 25—The task of mapping an aerial route from Seattle to Skagway, Alaska, has been undertaken by the Boeing Airplane Co. of Seattle, according to E. N. Gott, vice-president and general manager of the company. The flight will be made in ten hours, utilizing flying boats. The present boat time is about 120 hours.

METAL MARKETS

Pig Iron—Quite some tonnage of No. 2 Southern foundry iron is reported to have been taken on of late by the automotive industry. Following a recent inquiry from the General Motors Co. for 2000 tons, other business in Southern developed. For 1.75 to 2.25 silicon iron the price range is $42 to $44, Birmingham. In Pittsburgh, Cleveland and the Middle West markets generally the spot light continues to be on prompt deliveries rather than on price, which is about $44 base. Some automotive interests are reported to have been melting pig from what ought to have been their reserves before the transportation tie-up ensued, and these are now seeking to obtain small tonnages for spot delivery, price not cutting much of a figure in such transactions.

Iron and Steel—Due to difficulties in obtaining coke and other raw materials, production of rolled steel is probably at the rate of 75 per cent but the significant circumstance is that shipments are probably not more than two-thirds of production, so that one-third of all the steel produced is piling up at the mills. Amid such conditions the easing off of this load, which is a great financial hardship, by means of motor truck transportation provided by automobile buyers, should operate directly in buyers' favor. In fact, quite a few sheet mills can continue operations solely because automotive consumers are taking material away in motor trucks, else the mills would be so clogged they would have to shut down. For all that automotive buyers who need sheets for immediate delivery are reported to be paying extraordinarily high levels. Black sheets for which orders for deferred deliveries can be placed with independent mills at 7.00 cents base, are reported to have been sold in the Pittsburgh district to automobile interests at 11 to 12 cents. Open-hearth sheet bars continue to be the object of negotiations between automobile manufacturers (who plan to furnish them to sheet mills for conversion) and middlemen, the latter asking up to $90 and the former bidding around $80.

Aluminum—Although the sole producer of American aluminum continues to quote 33 cents per pound for virgin ingots, 98 to 99 per cent pure, there are now reports of offerings in the outside market at around 32 cents. The quantities offered are small.

Copper—Domestic demand continues negligible with electrolytic offered by resellers at 18⅛ cents. Exports that had to be financed with considerable effort are used as a market prop by producers but were obviously resorted to because there was no other outlet for the accumulated metal.

Tin—While the New York market for Straits tin is the lowest in several years, 53 cents being the approximate quotation, reports from the Middle West state that consumers have had to pay as high as 60 cents for spot metal because of the difficulties encountered in getting tin from the seaboard to consuming centers.

Lead—Spot lead is scarce and premiums of ¼ to ⅜ cent per pound are being paid in the outside market over the price of the principal producer which continues to be 8¼ cents, East St. Louis.

Brass—Connecticut valley rolling mills are slowly overcoming labor and transportation difficulties and manage to supply automotive buyers with small accommodation lots for immediate needs.

Automotive Financial Notes

Lansing Stamping & Tool Co. has declared a 50 per cent common stock dividend, payable July 1 to stockholders June 15. This is the first stock dividend authorized by the company, which paid a 6 per cent cash dividend in December, 1918. A statement accompanying the letter says the company has on its books business to keep it operating at capacity for the next 10 months, and lays stress on the increasing demand for its product for tractor work. The company is well supplied with steel and is experiencing little trouble comparatively as a result of the freight congestion.

Studebaker Corporation earnings for three months ending March 31, after Federal taxes, were at the annual rate of approximately $28 a share for the increased amount of common stock outstanding, after payment of the 33⅓ per cent stock dividend. The usual quarterly dividend at the rate of $7 a share annually on the common has been declared payable June 21 to stockholders June 10.

Packard Motor Car Co., for the first seven months of its fiscal year beginning Sept. 1, earned net profits of $4,035,369 after Federal taxes. This is exclusive of profits from retail subsidiaries which amounted to about $600,000. Total sales in the current fiscal year are expected to approximate $65,000,000 which compares with sales of $58,729,000 for the preceding year.

Fisk Rubber Co., in the four months Jan. 1 to May 1, has earned the full year's dividend requirements, with a comfortable margin to spare. In all likelihood Fisk will earn between $7 and $8 a share for the common stock after all charges have been paid, making the $3 dividend on the common, inaugurated last February, safe beyond all doubt.

Chandler Motor Co. declared a dividend of $2.50 a share, payable July 1 to stock of record June 15. The dividend is applicable to the entire 280,000 shares which will become outstanding as a result of the recent declaration of a 33⅓ per cent stock dividend payable June 10 to stock of record June 1.

Stromberg Carburetor Co., of America, for the first three months of 1920 shows a surplus of $204,478 or $2.72 a share after allowance for expenses and Federal taxes. This compares with a surplus of $86,702 or $1.73 a share earned on the shares outstanding in the corresponding quarter of 1919.

Hudson Tire & Rubber Co. has been incorporated at White Plains, N. Y., with a capital of $1,000,000. The incorporators are William M. Doucette, Arry B. Seymour, and Charles J. Wallace.

Willys-Overland earned in the four months ended April 30 in excess of $6,000,000 before depreciation and taxes. After all special charges and after taxes profits were approximately $3,600,000.

Mercer Motors Co. reports net earnings of $152,763 before Federal taxes for the three months ended March 31, 1920. This is at the annual rate of $611,000 or better than $6 a share on the outstanding capitalization.

Dort Motor Car Co. has been incorporated as a Delaware corporation with $47,000,000 capital. Incorporators are Dallas Dort, F. H. Aldrich, and D. M. Overall, all of Flint.

Jordan Motor Co. has declared the regular quarterly dividends of $2 a share on common stock and of 1¾ per cent on preferred, both payable June 30 to stock of record June 14.

Eagle Motorcycle Co., Brockton, Mass., has purchased the buildings of the Sterling Motor Car Co., Brockton, with the proceeds of a stock issue of $500,000.

Burn-Oil Tractor Co. has been incorporated with a capital of $250,000 at Warren, Ind., by T. A. Brookes, J. A. Beckelmann and C. E. Sanders.

General Aluminum & Brass Manufacturing Co.'s net sales for three months ending March 31 were $1,458,784.04. Net profit was $86,918.64.

Willys Corporation directors have declared a quarterly dividend of $1.50 a share, payable July 1 to stockholders June 1.

Bethlehem Motors Corp. of New England has incorporated with a capital of $300,000, as a subsidary of Bethlehem Motors Corp.

Wilson Body Offers $700,000 Stock Issue

DETROIT, May 24—C. R. Wilson Body Co., in offering $700,000 in 7 per cent cumulative preferred stock, filed a statement showing net earnings for the month of January, 1920, of $198,000, before Federal taxes. This is one and one-quarter times the full year's dividend requirements on the $2,200,000 of preferred stock outstanding. The company estimates net earnings in March of $620,000.

The proceeds of the issue now being put on the market will afford additional working capital by reducing bank loans incurred for construction of the new buildings, which the company now is occupying. The companies for which bodies are being built are Ford, Overland, Maxwell, Hupp, Paige, Oakland, Reo and Liberty. The company employs 2500 persons in Detroit and 550 at Bay City.

Britain Imposes New Duty Free Conditions

LONDON, April 30—(*Special Correspondence*)—The following official information covers the conditions imposed on importers of motor equipment to obtain the concession of being duty free. The motor car parts and accessories declared at the time of importation to be intended for use for the exempt purposes specified in the British Finance (No. 2) Act. 1915 are admitted free of duty on the importer giving bond:

(1) To keep proper stock accounts showing the receipt and disposal of the articles.

(2) To obtain before delivery to a customer a statement from him showing the particular exempted use to which the articles are to be put.

(3) To append to the invoice of his customer a statement to the effect:

(a) That no duty has been paid on the articles.

(b) That they are supplied for an exempt use which is specified, and

(c) That they are not to be used for any other purpose.

Officers of the British Customs and Excise examine the stock accounts on the importer's premises and verify, in a number of cases, at the customer's premises and elsewhere, the use of the article, and a person using for a dutiable purpose any article exempted from duty incurs heavy penalties.

Bank Credits

Written exclusively for AUTOMOTIVE INDUSTRIES *by the Guaranty Trust Co., second largest bank in America.*

NEW YORK, May 26—The wave of price cutting has become more widespread, but an uninterrupted continuance of such price reductions is not generally expected.

The announced foreign trade figures for April reflect a continuance of the readjustment of the nation's industrial and commercial activity. As compared with the figures for March, exports, valued at $685,000,000, declined $135,000,000, while imports, valued at $496,000,000, declined $28,000,000. The trade balance accordingly declined from $296,000,000 in March to $189,000,000 in April. In April, 1919, the excess of exports over imports was $242,000,000.

The tightness of credit continues, although call money rates have eased somewhat in the last week. Mercantile paper again advanced. Six months' choice names were quoted at 7½ per cent, as compared with 7 per cent a week earlier. The Atlanta Reserve Bank has indicated a plan to restrict loans on automobile paper. Banks generally are endeavoring to bring about commodity liquidation by insisting on the repayment of commodity loans.

Both the gold and the total reserves of the Federal Reserve Banks increased slightly last week, while total bills declined $47,000,000 and net deposits $55,000,000, the net result being a gain of one-half a point in the reserve ratio.

The liquidation of securities and commodities was reflected in the reduction of $29,000,000 in the combined loan account of the New York Clearing House banks; the decline of $73,000,000 in the New York Reserve Bank's loans to member banks secured by Government obligations; and the gain of 2 points in the bank's reserve ratio.

EMPLOYEES ADOPT WORK WEEK

BUCHANAN, MICH., May 25 — Following the adoption of the working schedule by a meeting of the employees of the Clark Equipment Co. it was announced that the previous practice of vacation with pay will continue to apply to all employees. Under this regulation each person in the employ of the company one year is granted a week's vacation with full pay. The new working schedule calls for a 54-hour week from the day force and 55 hours from the night force, all time above 50 hours to be overtime, paid for as time and a half. The night force works 11 hours the first five nights of the week.

Men of the Industry

W. A. Gifford has been elected president of the Gifford Engine Co. of Lansing, Mich. Other officers elected are: C. L. Anderson, vice-president; O. C. Bleed, secretary; S. E. Lamb, treasurer. The company, which originally was organized to build gas engines, now is engaged in the manufacture of automotive accessories.

James V. Lyons, for the past six years central representative of the American-La France Fire Apparatus Co., Elmira, N. Y., nas resigned to join the Sewell Cushion Wheel Co., Detroit, as manager of its national account division.

L. M. Baker has been appointed representative in Michigan for the Dittmer Gear & Mfg. Corp., of Lockport, N. Y. He was formerly supervisor of sales of the motor equipment division of the Hyatt Roller Bearing Co.

E. C. Moore, formerly with the Gier Pressed Steel unit of the Motor Wheel Corp., has been assigned to the head of the welfare department of the corporation. Mr. Moore's offices are with the Prudden Wheel unit.

Edward K. Roberts has been made general sales manager of the Stewart Motor Corp., Buffalo, N. Y. Charles C. Craig, former general sales manager has been promoted to assistant to the president.

George E. Long, senior vice-president of the Joseph Dixon Crucible Co., has retired after forty-three years of service with the company. He will continue as a member of the board of directors.

W. H. Kilpatrick has been appointed plant engineer of the Willys-Overland Co., Toledo. His most recent work was the laying out of the new Buick and Chevrolet assembly plants in St. Louis.

F. R. Granger has been appointed sales manager of the Fort Wayne Tire & Rubber Mfg. Co., Fort Wayne, Ind. He was formerly head of the service department of the Pennsylvania Rubber Co.

Ralph Murphy, chief engineer of the Franklin Automobile Co., has been promoted to assistant to vice-president Wilkinson. He is succeeded as chief engineer by Louis Stellman.

S. A. Jenkins has resigned as district manager for the Willard Storage Battery Co., at Indianapolis, to become district manager in Detroit for the Bijur Motor Appliance Co.

L. E. Wagner, corporation sales manager for the Diamond T motor truck, has severed his connection to assume a similar one with the Oneida Motor Truck Co., Green Bay, Wis.

W. P. Anderson has been named assistant to vice-president Kramer of the Willys-Overland Co., Toledo. He was formerly with Delco, Wright-Martin and Curtiss.

Lieut. Col. Lindley D. Hubbell is now vice-president in charge of production of the Hendee Mfg. Co., Springfield, Mass., makers of Indian motorcycles.

H. W. Ewens, Buffalo, has accepted the position of works manager of the Frost Mfg. Co., Kenosha, Wis., makers of brass castings and specialties.

Arthur J. Sheldon has been appointed production manager of the Willys-Overland Co. He was formerly with General Motors at the Buick plant.

D. M. Rhoades has been appointed sales manager of the Lack Mfg. Co., Paducah, Ky., manufacturers of Multi-Disc aluminum wheels.

Otto E. Szekely has been engaged as a consulting engineer by the United States Tractor & Machinery Co., Menasha, Wis.

E. L. Larson of the Detroit Pressed Steel Co., has accepted the position of production manager with the Locomobile company.

Charles R. Newby has been appointed general sales manager of the Bethlehem Motors Corp., Allentown, Pa.

W. H. Masten has been appointed assistant general manager of the Oakland Motor Car Co., Pontiac, Mich.

Cornelius T. Myers has been engaged as consulting engineer with the Wood Wheel Association.

Slusser Named Head of Coast Goodyear

AKRON, May 24—Clifton Slusser, who went to work for the Goodyear Tire & Rubber Co. eight and a half years ago as a stenographer in the service department, will leave this month for Los Angeles to be general superintendent of the Goodyear Company of California, the new $15,000,000 subsidiary on the coast. Slusser, who is 30 years old, was born in Massillon, Ohio, and left school at the age of 11 to go to work as a glass blower in his home town. Since then he has been a machinist's helper, plumber and rubber worker. He went to business college nights.

The first thing Slusser did after he went to work for William Stephens, now Goodyear production superintendent, as a stenographer, was to take a factory course after hours. Every time an emergency arose he got into it. He organized the Goodyear "flying squadron," which now numbers 1400 men and is used to balance production. When a foreman took his vacation Slusser ran the department for him. When the superintendent of the Canadian plant became ill, Slusser went up and ran the factory.

He has been successively through every department in the great plant and a year ago was made personnel manager and a member of the executive council. At Los Angeles he will have charge of 5000 men who will be expected to turn out 5000 tires a day.

Lawson to Operate Chicago-New York Line

CHICAGO, May 24—Ten passenger planes will be put in service July 10 between New York and Chicago by the Lawson Airline, according to Alfred W. Lawson, the company's president. He stated that landing fields already had been contracted for at Chicago (Ashburn Field), Toledo, Cleveland, Buffalo, Syracuse, Rochester and New York.

"Each plane will carry twenty-six passengers or four tons of freight and we will have day and night machines," Lawson said. "The schedule will be such that a passenger may leave here at 8 in the evening and be in New York by 6 the next morning."

Lawson is the designer and builder of the Lawson plane that made a circuit of the Eastern section of the United States.

Navy Department Gets Curtiss "Wasp"

ROCKAWAY, L. I., May 26—The Curtiss "Wasp" fitted with pontoons made an officially timed speed of 138 m.p.h. over a measured course. This is much greater than the former record of 126 m.p.h. made by a Curtiss "HA-Hydro." The "Wasp" has been turned over to the Navy Department and will be flown to Hampton Roads to be used in training.

This is the same machine that made a speed of 162 miles per hour with full military load and fitted as a land plane. It was designed as a two seater fighter near the end of the war. Until recently it held the world's altitude record of 32,450 ft. actual height. Also in the hands of Roland Rholfs it made the extremely rapid climb of 19,200 ft. in ten minutes.

Another machine of this type has been sold to the Bolivian government and has been successfully flown by Donald Hudson from the military airdrome at La Paz. This field is at an altitude of 13,000 ft. above sea level and considerable doubt was expressed that any flying could be done there.

BAIRSTOW ACCEPTS POST

LONDON, April 30 (*Special Correspondence*) — Dr. Leonard Bairstow, C.B.E., F.R.S., has accepted the professorship of aerodynamics at the Imperial College of Science and Technology. During his career at the National Physical Laboratory Dr. Bairstow specialized in the study of the stability of aircraft, and he made his reputation and gained his F.R.S. by the application of Professor Bryan's mathematical theories on stability to actual airplane models and full-sized machines. He has also done much valuable work in analyzing performances of aircraft. His writings on aerodynamics are in the form of a standard textbook.

Dr. Bairstow is a fellow of the Royal Aeronautical Society and a member of its council. He joined the Air Board in 1917. He was responsible, as technical advisor on aerodynamics, to Colonel Ogilvie, who was then in charge of the research department. He is a member of the British Advisory Committee on Aeronautics, of Lord Weir's Committee and of the Air Inventions Committee.

JAMES F. LARDNER DIES

CHICAGO, May 24—James F. Lardner, secretary and general manager of the Rock Island, Ill. Plow & Tractor Co., died suddenly at his home, aged 58. He had been with this concern for twelve years and had become prominent in the implement and power farming world. Burial was in Chicago, his birthplace.

Calendar

SHOWS

Oct. 6-16—New York. Electrical Show. Grand Central Palace. George F. Parker, Manager.

Dec. 10-18—New York. Motor Boat Show. Grand Central Palace.

FOREIGN SHOWS

June 21-27—Sunsvall, Sweden. Automobile Exhibition. Norrland Fair.

June 26-July 25 — Commercial vehicles, tractors, camions and engines. Antwerp.

July 9-20—London, England. International Aircraft Exhibition. Olympia. The Society of British Aircraft Constructors.

Aug. 7-Sept. 15 — Motorcycles, sidecars, etc. Antwerp.

October—London. Commercial Vehicle Show, Olympia.

November—London. Passenger Car Show, Olympia.

CONTESTS

May 31 — Indianapolis, Ind. Speedway.

May 31—Brockport, N. Y. Dirt track.

June 12—Uniontown, Pa. Speedway.

June 14—Omaha, Neb. Truck Reliability Run.

June 17—Portland, Ore. Dirt track.

June 17-18—Chicago, Inter-Club Run, Chicago Automobile Club.

June 19—Ogdensburg, N. Y. Dirt track.

July 4—Tacoma, Wash. Speedway.

July 4—Hanford, Cal. Dirt track.

July 4—Spokane, Wash. Dirt track.

July 5—Batavia, N. Y. Dirt track.

July 17 — Warren, Pa. Dirt track.

July 24—Watertown, N. Y. Dirt track.

July 31—Fulton, N. Y. Dirt track.

Aug. 7—Erie, Pa. Dirt track.

Aug. 14—Buffalo, N. Y. Dirt track.

Aug. 20-21—Middletown, N. Y. Dirt track.

Aug. 21—Johnstown City, Pa. Dirt track.

Aug. 21—Elgin, Ill. Road race, Chicago Automobile Club.

Aug. 28—Canandaigua, N. Y. Dirt track.

Aug. 27-8—Flemington, N. J. Dirt track.

August, 1920—Paris, France. Grand Prix Race. Sporting Commission Automobile Club of France.

Sept. 1—Glidden Tour—N. Y. to San Francisco.

Sept. 5 — Targa Florio Race, Sicily.

Sept. 6—Hornell, N. Y. Dirt track.

Sept. 6—Cincinnati, O. Speedway.

Sept. 6—Uniontown, Pa. Speedway.

Sept. 17-18—Syracuse, N. Y. Dirt track.

Sept. 25—Allentown, Pa. Dirt track.

Oct. 1-2—Trenton, N. J. Dirt track.

Oct. 8-9—Danbury, Conn. Dirt track.

CONVENTIONS

June 7-10 — Indianapolis, Ind. Annual Convention of the Associated Advertising Clubs.

June 7-11 — Del Monte, Cal. Automotive Equipment Association, Directors' Meeting, 7-8; General Sessions 10-11.

June 22-25—Asbury Park, N. J. Annual meeting American Society for Testing Materials.

S. A. E. MEETINGS

June 21-25 — Ottawa Beach, Mich. Summer Conference.

Fulton Motors to Add Car to Truck Line

NEW YORK, May 24—The reorganization of the Fulton Motors Corp. has been completed under the presidency of Garvin Denby and operations have been resumed. The factory operations are in charge of J. L. Bell and sales and service under the direction of C. J. Fox, Jr. Hereafter all business will be done from the factory at Farmingdale.

Many changes have been made in the construction of the truck. The engine has been enlarged to 3½ by 5. Transmission will hereafter be the Covert and the gear reduction to the rear axle has been changed from 10 to 1, to 8 to 1. A heavier frame has been adopted.

While only a small number of trucks is being produced at present, due to recent embargoes placed upon material, a production of 1500 trucks for the remainder of the year is planned. The corporation has its entire output sold, and is, in addition, flooded with large export orders.

It is planned to add, a little later, a 2½ to 3-ton model, and as soon as the material situation lightens, to use various lengths of wheel base on all models, so as to suit the models to every class of trade.

The corporation has perfected a passenger car, which it is planned to add to the line. The car will be a 4-cylinder, interchangeable with a 6-cylinder, but will be of European type in design.

EXAMINATION FOR MOTOR CORPS

WASHINGTON, May 24—The United States Civil Service Commission announces that competitive examinations will be held June 22 for superintendent of motor transportation at the Wingate general ordnance depot, Fort Wingate, N. Mex. Vacancies in the various general ordnance depots throughout the country at salaries ranging from $2,100 to $2,400 a year and vacancies requiring similar qualifications at these or different salaries will be filled.

Applicants must have the equivalent of a standard high school education and must have had at least five years experience in the operation and maintenance of motor vehicle equipment with one year in a supervisory capacity. Examinations will be given in the custom houses at New York, Boston and New Orleans, and in the post offices at Philadelphia, Atlanta, Cincinnati, Chicago, St. Paul, Seattle, San Francisco and St. Louis.

France Sells Bulk of Cars Left by Army

PARIS, May 3—(*Special Correspondence*)—According to a statement made by the Minister of Finances, there have been sold 52,000 of the 70,000 automobiles left by the American Army in France. In consequence there are only 18,000 more to sell. According to the same authority all sales will have been completed by the end of the year.

In connection with this statement it should be noted that the Service de la Liquidation, which is the body responsible for the sale of army automobiles in France, has never been able to ascertain how many vehicles were left behind by the American Expeditionary Forces. The chief of this service declared that he had received 40,000 passenger cars and trucks for sale; the American Army records showed that at least 20,000 more were in France at the Armistice.

JOSEPH RYAN DIES

BOSTON, May 24—Joseph Ryan, formerly president of the Automobile Club of America and well known in the motor trade in New York, died suddenly yesterday at the home of his mother at Needham.

Winther Motor Builds Passenger Car Factory

KENOSHA, WIS., May 24—The Winther Motor Truck Co. of Kenosha, Wis., which recently announced its entrance into the passenger car field, has started work on plant additions providing 25,000 sq. ft. of additional manufacturing space for the new line. The building will cost $45,000 and the equipment about $50,000.

The first regular production of the Winther Six is now coming through the Kenosha plant and being distributed through the Winther Motor Sales Corp., of which E. Z. Jones is director of sales. A nation-wide distributing organization is being perfected. The Logan Sales Co. of Columbus, S. C., a new $100,000 corporation, will handle the Carolinas, Florida, Georgia and parts of the Alabama and Tennessee territory on both passenger and commercial cars, and has contracted for vehicles of a total value of $7,600,000. Other zone distributers already appointed include: Massachusetts Motors, Boston; Onondaga Motor Corp., Syracuse, N. Y.; Gaines Auto Co., Scotts Bluff, Neb.; Goodhart Motor Car Co., Sioux Falls, S. D.; Buxton-Wyoming Motors, Kansas City, Mo.; Western Motors, Inc., San Angelo, Tex.; Chessman-Stater Motors, Portland, Ore.; Industrial Export Co., New York City.

COLT SEES NEW CAR ERA

NEW YORK, May 24—Samuel P. Colt, chairman of the board of the United States Rubber Co., believes more motor vehicles will be sold six months hence than are being sold to-day. He does not think the automobile industry will be adversely affected by the readjustment now taking place. He points out that the motor truck is being used in steadily increasing numbers and that the passenger car is being utilized to a greater extent than ever for business purposes.